

ITEMS OF INTEREST.

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ORIGINAL COMMUNICATIONS.

PORCELAIN DENTAL ART.

Dr. W. A. Capon, Philadelphia.

[CONCLUDED].

A valuable portion of this branch of dentistry is the making of all porcelain bridges. These have advantages in many places over gold and porcelain, but should be used as an auxiliary rather than an entire substitute.

Few dentists make this work because it requires considerable practice, and I may say courage, to become expert. It also demands a thorough knowledge of porcelain furnaces, oxihydrogen, blow-pipe, etc. As to method, I am safe in saying that every man has his own idea on the subject, and the variety of his methods will greatly depend on his ingenuity, for, like many other portions of dentistry, variety of methods mean safety and success. Its principal advantages are its strength, cleanliness and low cost of production, and in front portions of the mouth, its natural appearance from entire absence of gold, and the supplying of lost tissue by gum enamel, forming a continuous gum section. The strength of a porcelain bridge will depend considerably on length of bite, and, for example, we will imagine a space requiring a bridge from first bicuspid to third molar, the bite very close, and solid teeth for anchorage. Then gold and veneers would be stronger and preferable, because attachments are made with less loss of tooth structure and the metal will stand a greater strain. If it is one with a moderately deep space, and the anchoring teeth frail or broken, a porcelain section would be stronger, with advantage of appearance being more natural. The attachment to the bicuspid would be a porcelain veneered platinum jacket while the molar could be the same, or a plain platinum cap with cusps of pure platinum.

A space in front of the mouth from cuspid to cuspid with considerable absorption of process is a place where a porcelain bridge is particularly advantageous. The lost tissue is supplied by gum

enamel, still leaving sufficient space for proper cleansing and keeping lip in natural contour, whereas in a gold and porcelain section the teeth have to be unnaturally long to supply gum deficiency or else show an unnatural space also, allowing lip to fall in, wherever the teeth can be ground sufficiently to allow of a porcelain veneer. A jacket makes the best anchorage, and will stand all the heat desired, but if the anchoring teeth are strong and sensitive, a platinum cap will substitute gold and be less conspicuous, but many times the patient prefers the gold, and then the work must necessarily be gold throughout.

For making small sections of one or more teeth, say bicuspid, or one bicuspid and a molar, a familiar and simple way is to run a bar of iridio-platinum wire, and extending with dove-tail ends to be built in adjoining teeth with gold or amalgam. There are many doing excellent service for years, even after becoming slightly loose in the socket, and I firmly believe a slight motion is no disadvantage. Where the sections are of more teeth, a narrow iridio-platinum plate is swaged to fit the ridge of the gum, which gives the work greater firmness. Wherever possible, it is better to make jackets for abutments, or in case of removable section, cover the anchorage with a gold cap, having a slight projection on gum line next to space. A wide platinum band to fit this tooth, and baked in the porcelain, and so fitted that lip or shelf on gold cap will keep the section from fitting too closely to gum. Another method is to run a bar from tooth to tooth across the space and built firmly in cavities, or, if working on roots, make foundation on Richmond crown principle, with pins projecting from the caps and pins soldered on the bar for each tooth to be supplied. A hood or covering is made of platinum foil, to fit the bar and pins, and the whole baked in one section and then cemented in position. By this means the foundations and bar may be all gold, if desired, and if ever broken the repair can be made without interfering with the foundation.

Another method is to make a half platinum cap for each tooth to be inserted, and then soldered side by side, presenting a smooth surface of metal to the tongue and gum, while the outer and grinding surface is filled with porcelain and veneers attached or carved, as the operator may desire. This form is attached by platinum caps or jackets, and makes the strongest and most finished kind of work. To make solid platinum cusps an oxihydrogen flame is used to melt platinum scrap in small balls, and swaged in a steel die and then soldered to platinum cap, as in ordinary gold cap crown. The cleanliness of all porcelain is a very great inducement and argument in favor of its use, for in the

largest section there cannot be a possible chance of saliva infiltration or lodgment of food if there is proper and sufficient space between gum and section.

The cost of material is less than half, and sometimes a mere fraction of the cost required to make an all-gold and porcelain section. The risk in making is no more, and fitting is much easier, without defacing the completed work. It emerges from the furnace in a completely finished condition, saving hours of grinding and polishing required with gold and running no risk of breakage, which has been every one's experience, causing the loss of many hours of tedious and careful work.

In conclusion of this article, I feel it my duty to credit the position in which we find the judicious practice of porcelain a legitimate part of dentistry, very greatly to the perseverance and untiring efforts of Dr. C. H. Land, of Detroit, Mich. By his many methods and appliances we are enabled to practice a branch of dentistry appropriately called porcelain dental art.

DENTAL LAWS IN OTHER COUNTRIES.

Dr. R. B. Weiser.

Almost all civilized nations of the world have some dental legislation. Some of the laws of foreign countries are very elaborate. They are Austria, Hungary, Belgium, Brazil, Cuba, Denmark and Danish provinces, England, France, Germany, Dominion of Canada, British Columbia, Manitoba, New Brunswick, New Zealand, Victoria, Nova Scotia, Ontario, Prince Edward Island, Quebec, Holland, Italy, Mexico, Russia and Spain. Nearly all of these countries require a Board of Dental Examiners appointed by the Crown or Boards of Health or elected by the Dental Associations. In many countries dental diplomas are recognized, and in others they are not. A fee of some kind is usually charged. In many places the examinations are very rigid indeed, and are prescribed by law.

The dental laws of all foreign countries are very similar to our own, from which many of them seem to have been copied.

Italy provides that no person shall practice dentistry unless holding the degree of medicine and surgery.

In New Zealand the law requires registration, and the first qualification for registration is that they should show that they are of good moral character.

In Denmark any person desirous of practicing dentistry must first pass an examination in Danish history, geography, geometry,

algebra, English or French. The examinations are conducted by members of the medical faculty and several dentists appointed by the Board of Health. In mechanical dentistry the candidate must give proof of his skill by the "setting and insertion" of a single artificial tooth and six partial or full dentures. In operative dentistry he must also, by practical demonstration, prove his ability to perform the various operations in the mouth. He must procure the patients and materials himself, the work being done in the laboratory of some one dentist of the board, who will have special control over these tests. The work must be done within fourteen days, and be judged by the whole board. The dentist appointed as special supervisor for this work receives 20 riss, \$10. The theoretical trial or examination is conducted by the whole board, verbally, and is as follows: Anatomy and physiology of the face, teeth, gums and mouth; pathology of the mouth, teeth, gums and jaw bones, also diseases of the teeth and gums; the preparation and effect of medicine in denistry; a knowledge of dental instruments and their application; indications for the different operations and their practical execution. The examination fee is 20 riss, \$10. No dentist is allowed to administer an anesthetic without the presence of a medical practitioner.

France the same.

METHOD OF LINING RUBBER-PLATES WITH ALUMINUM.

Thos. Rhodes Pixton, D.D.S., Philadelphia.

Lining rubber-plate with gold and other metals is not new. The primary object is to prevent the chronic soreness of the mucous surface by the action of sulfur contained in the rubber. Some say mercury, but I have had the same trouble with black rubber, which does not contain mercury. Our more wealthy patients can afford to pay for gold-plates, and will have none other. But there are those whose means are limited, and yet should be made comfortable.

In 1860 I worked a good deal with aluminum, both stamped and cast work, but owing to its price (then \$18 per ounce) it was too expensive. After a few years I turned my attention to gold-lining, but met with the same difficulties, namely, time and expense. The gold had to be swedged, and the expense very little less than that of gold-plates. Tin linings were next tried, but proved unsatisfactory. Six years since I commenced again with aluminum, the cost of which was by this time reduced to about eighty cents per pound. I buy the metal in bars, ten or twelve inches long, by about one inch thick. I saw them in lengths of

two and a half inches and three inches. These are then rolled cross-wise till reduced to 28 gage, this being, after repeated trials, found to be the best thickness for the purpose.* You now have the metal ready for lining. The metal will be hard from rolling, but cut a piece off too large, for the cast, for you need not be economical with this as with the gold ; leave plenty of material to work on, as the cost is only one cent per plate. You first anneal the metal, some think that on account of the softness of the metal that it can only be annealed by dipping in oil, igniting it and holding it till it is burnt off. This is a dirty and bad-smelling method which I never practice. Any one who is expert with the blow-pipe can do it by blowing a slow, broad flame till the metal becomes white, like unburnished silver. If you heat it to a red heat your metal will burn and become worthless. A few trials will soon make you an expert annealer. You now take your cast which must be hard and dry. If not quite dry enough put it on your gas stove for half hour. Place the aluminum on the cast and with your two thumbs press the metal down in the cast. Then commence to burnish it in shape. The best tool for this purpose is a bone tooth-brush, the handle of which comes to a nice rounded point and, with soap and water for a lubricant, in a few minutes you can burnish the whole palatal surface to shape. Anneal again. Hold the plate well in the cast and commence to burnish from the palate on the top of the ridge. Never forget that whether hammering or burnishing you must commence from the center and stretch the metal to the outer edge, otherwise you get folds that will be hard to get out. After having the plate well-burnished on the palate and ridge, hold the plate firmly with your fingers and commence folding over a little at a time and evenly all round to prevent folds. With a little practice and not losing your patience you can make a very close fitting plate equal to being swedged. Now prepare it for adhesion to the rubber. This is done with a sharp enamel chisel. Hold it at an angle of about twenty-five degrees and make an incision a thirty-second of an inch long, turning up the metal in the form of a hook. Do this all around the edges and over the palate. Then cut around in the opposite direction forming a double hook. These are small, but quite sufficient to hold the rubber. Now anneal the plate for the last time to make it soft, so that if it is not a perfect fit the pressure of the rubber while screwing the flask down will force the metal tight all around the cast, and make it a tight fit. Set your teeth up on wax, and proceed in the usual method, as in making a rubber-plate.

*You can now buy it of any thinness, and nicely annealed.—Ed.

LUXATION, OR THE IMMEDIATE METHOD IN THE TREATMENT OF IRREGULAR TEETH.

George Cunningham, in World's Dental Congress.

When an erupting permanent upper incisor has become twisted on its long axis, so that its mesial and distal surfaces assume a labio-palatal direction, and its cutting edge is proximately at right angles to the apposing tooth of the lower jaw, it has been the practice of several English practitioners to treat them by what is termed "torsion." This operation consists in grasping the tooth near its neck with a suitable pair of forceps, the beaks of which have been guarded with sheet lead or some other substance to prevent injury to the enamel, and then steadily, but forcibly, rotating the tooth within the socket in its normal position.

Though some teeth so treated have been lost by putrefaction of the pulp and abscess formation, or by necrosis and absorption, there is ample evidence that the operation has been completely successful in a sufficient number of cases to warrant the operator continuing the practice under such circumstances as the patient being unwilling or unable to undergo the slower method of rotation by mechanical appliances.

It is evident that an important factor in their treatment must be the particular stage of root formation. The rotation of such a tooth for a young patient where the root is incomplete, and therefore attached to the surrounding tissues by the solid cord of tissue filling up the funnel-shaped root, must differ materially as to conditions from the rotation of a similar one with the fully completed root, where the central soft tissue connection must be filamentous rather than cord-like. I am not aware of any reliable statistics which indicate that the operation is more practicable in one case than the other, nor what are the reasonable prospects and percentage of success. In my own practice I have, therefore, always adopted slow rotation by mechanical means, and quickly succeeded.

The fact that immediate rotation has been successful, coupled with the knowledge of the extraordinary repair which takes place in fracture of the jaw even accompanied with complete dislocation of the teeth, induced me to resort to luxation in the treatment of irregularities where ordinary treatment was not applicable. In the course of my papers and discussions on implantation, I have suggested that this artificial production of a fracture of the alveolus is appropriate in some cases, and possesses the advantage of enabling me to move a tooth in a new position without separating it from its attachments to periosteum and the socket.

TEMPORARY STOPPING.

J. Foster Flagg, D.D.S.

Temporary stopping is the name given to a material which was first suggested to dentistry by I. H. Levy, D.D.S., of Philadelphia, in 1879, "as a substitute for cotton and varnish."

Its value was at once accepted even though some of its varied attributes were not, at first, recognized, but so fully did it meet several requirements that it immediately took rank as an acknowledged "plastic."

It was first made from red gutta-percha baseplate, white wax, silex and feldspar, but the last two ingredients are now practically superseded by precipitated chalk, this making a material which possesses a smooth plasticity not attainable with even the finest of the original mineral components.

The present compound of red gutta-percha baseplate, white wax and precipitated chalk is that form of gutta-percha stopping which possesses the lowest grade of heat test, and is therefore especially indicated in near approach to pulp work; the greatest exemption from leakage (being almost non-leaky) and is therefore utilized for "intermediate" work, to protect pulps from irritating or injurious medicaments or chemicals, as in sensitive dentine work, or, in the employment of zinc-phosphate in "combination" fillings, as well as for the covering of arsenical applications in positions devoid of danger from attrition.

Its color is, and always should be, pink, for the reason that thus it is a constant warning of danger—if danger exist—as in approach to vital pulps; a constant guard against leaving any unfinished work; a constant indicator of conditions, as in relief taps, domes, approaches to pulp cavities, etc.; in short, a constant reminder of its presence in all its variety of utilization.

I refer particularly to this attribute, as white temporary stopping is offered for sale, and as I know from extended clinical observation that it is a frequent source of possible and actual danger, possible neglect and probable trouble.

It is sometimes referred to as being made without wax, as though this were advantageous, when the opposite is true, as one of its most valuable attributes—non-leakage—is dependent entirely on this constituent, or on some other analogous, and no other that I have tested has proven in the least degree superior to the originally suggested white wax.

It is a curious and interesting fact that temporary stopping is one of the only two materials used in operative dentistry

on which there is absolutely no discount in their legitimate using.

Temporary stopping is used for temporarily filling cavities of decay when exigencies demand this, for protecting pulps from thermal changes when this alone is needed for prevention of pulp irritation from such medicaments as carbonate of potassa, chlorid of zinc and phosphoric acid; for "doming" over vital pulps in questionable cases; for "tubing" fillings, from pulp cavities out, thus facilitating future relief from peridental irritation should such ever be demanded; for filling the larger portions of canals and the entire bulbous portion of pulp cavities; for the effectual sealing of arsenical applications in cavities of decay not exposed to attrition, and occasionally for the maintenance of space, gained by wedging between bicuspid or molars.

As retaining wedge in front spaces, low heat gutta-percha or better yet, zinc-phosphate, is much better than temporary stopping, but even here this pink material temporarily filling the cavity or cavities beneath, subserves the double purpose of showing decidedly just what needs to be filled, and also of surely preventing any possible injurious phosphoric impress which might result from the use of the zinc-phosphate retainer.

Temporary stopping may be warmed over the flame of a spirit lamp or Bunsen burner, while held by a small probe, or on the upper plate of the gutta-percha warmer, from which it is taken by a probe, and should be worked with instruments which are slightly warmed, if it is to be used as an "intermediate," though, with a properly made material, warm instruments are not necessary.

Dr. J. D. Patterson, Kansas City, says: It has been a surprise to hear so much on what is called rubber disease. I think there is no such thing at all. It has been proved that the mercury in rubber is entirely inert. The first and prime cause is uncleanness of the plate. A rubber plate perfectly polished inside and outside will be as good as a gold plate, except that the gold plate is a good conductor of heat; but if the rubber plate is taken out at night the irritation will be done away with to a large extent. I have had experience with gold, aluminum and all kinds of rubbers, and I do not believe there is any poisonous quality in the rubber that affects the mouth. The little ducts are destroyed by keeping the plate in the mouth continuously; more, perhaps, in rubber because it is more confining. Rubber disease has been unknown to me for fifteen or twenty years. It has been demonstrated that no deleterious effects can be produced by the presence of mercury in rubber.

OXIPHOSPHATE.

Prof. J. Foster Flagg.

What of it?

Is it good as a permanent filling alongside of gold or amalgam?
Is it a failure also?

What does the profession say of it?

Everywhere you hear the cry, it gives way at the cervix in all cases and soon wears away, and is not fit for contour or permanent work. It is not to be relied on?

If this be true, then it is useless to place it in carious teeth.

That it will preserve tooth-structure from further decay admits of no doubt.

That it will preserve the contour of the tooth is generally certain.

That it will not destroy the pulp in near contact with it is equally sure.

That it will preserve tooth-structure with nearly all the decay left in the cavity and without much or really any shaping is incontestable. It is beyond value when you know how to mix it, how to manipulate it, how to shape it; how to treat it before you remove the dam or allow it to get wet; how to treat the phosphoric acid, to keep it from crystallizing, insuring you thereby a better result in every way; and when proper precautions are taken with these fillings, how inestimable are the results, and beyond cavil and doubt!

International

A NEW OPERATION FOR THE EXCRETION OF THE TRIGEMINAL NERVE.

Dr. Truman S. Brophy, in American Association.

In this operation, for the relief of neuralgia, no external incision is made. The foramen is enlarged from above downward, enabling the operator to carry a slender, curved drill, along the line of the canal; a finger of the left hand recognizing the presence of the drill before it passes through the soft tissues. By this method without any hemorrhage, the contents of the nerve canal in the inferior maxilla are removed, the canal being so reamed out that bone tissue will form, filling up the canal, making recurrence impossible.

The contents of the nerve canal are removed more easily than that portion of the dental pulp which is in the root of a tooth.

The operation is especially commendable in that there is no division of the external tissues, consequently no disfigurement of the patient, no hemorrhage, and no recurrence. The first of the three operations performed in this way had been made in April, and there has been no recurrence up to October.

Dr. John S. Marshall does not think sufficient time has elapsed to say that there will be no recurrence. This can never be guaranteed, because the operation may not reach the seat of the origin of the trouble, which may perhaps be in the ganglion of the brain, or from some remote spicula of bone pressing on the nerve.

Dr. Brophy replied that in one of the cases the volume of the nerve was three or four times the normal size, the nerve having the appearance of being ligated at the foramen. This being probably the cause of the suffering, the cause being removed, there would be no recurrence.

GETTING PURE DRUGS.

The question of pure drugs is one of paramount importance.

A dental friend of the writer's recently showed him a small vial of muddy, reddish fluid, brought to him by a patient who was alarmed at the marked difference between this sample and a previous one obtained at another drug store. The original prescription was for beechwood creosote, and the second druggist had simply substituted crude commercial carbolic acid. The patient's escape was a fortunate one, and he was cautioned about patronizing any drug store save that specified on the prescription.

The doctor related another annoying case which he was then treating. Patient's teeth were in a very bad condition, and the breath exceedingly offensive. He prescribed a wash of that ideal antiseptic, listerin. Patient returned in a couple of days complaining of the pain inflicted by the wash, and the doctor found the entire buccal surface highly inflamed and eroded in spots. Upon investigation, the "Listerin" was found to be a highly acrid, irritating fluid, evidently containing a large amount of carbolic acid. An original package of the genuine listerin was then obtained and the trouble rapidly abated.

These illustrations point anew the moral so often emphasized by *The Healthy Home*, that it is the height of folly to buy drugs except of well-known and thoroughly reliable dealers. The buyer is not a judge of the quality of the goods furnished, yet on their purity depends the well being, perhaps the life, of himself or his dear ones.

PURE COCAIN.

Dr. D. W. Barker, Brooklyn.

In reply to your inquiry concerning my experience in the use of cocain, I have to say that the so-called toxic effects appear to be caused by certain secondary alkaloids (*vide* January ITEMS, p. 62), which are not eliminated in the process of manufacture. An experience of ten years in the use of cocain, and with different manufactures of the drug, has led me to believe that there is a great difference in the product of different manufacturers. For five years past I have used exclusively in my practice the cocain made by Parke, Davis & Co. The result of my observation is that it is very free from those toxic symptoms that sometimes appear. I am not prepared to say that Parke, Davis & Co.'s cocain cannot produce toxic symptoms; but I cannot remember that I have seen them, and I have seen them follow the administration of that of other makers very promptly and markedly.

In the process of manufacture by Parke, Davis & Co. great care is taken to eliminate the secondary alkaloids and insure an absolutely pure product. To effect this only the large crystals are used, and these are purified by recrystallizing several times. It is also required that a 4 per cent solution shall not reduce or decolorize a 1-1,000 solution of permanganate of potassium. This is a simple and easy test, and any one may make it for himself.

A young blacksmith employed in the railroad shop here, six years ago broke the ramus of his jaw on the left side, about an inch below the sigmoid notch. His jaws would not open far enough to allow me to introduce my little finger between his front teeth. He was only able to triturate his food by a lateral movement which gave him a poor articulation, as partial ankylosis prevented the free use of the lower jaw. He came to me suffering intensely from an exposed nerve in the left lower first molar, the posterior buccal wall entirely gone. To extract it forceps were out of the question. The key, a most valuable instrument, I have found where large molars deeply set, with one side gone, as in this case, was resorted to. It has a movable button which was placed against the alveolar process on the buccal side, and a hook which was forced between the jaws, and pushed down to a position just above the bifurcation of the roots. Right here permit me to explain more fully the functions of the key, the movable button *must* be directly opposite or

on a line with the point of the hook. If the button is below the point there is danger of breaking the hook, and if the button is above the point the danger of fracturing the alveolar process is increased, so a little care and caution is necessary, and then the key which is so much abused, and I might say often justly, becomes indispensable to an extractor. After the key was placed in position properly, a good twist lifted the tooth partially out of its socket, the close proximity of the occluding teeth preventing its further progress in that direction, so a quick turn of the instrument down and sideways brought the tooth out with little or no laceration of the tissues, which I was afraid of, as it measured seven-eighths of an inch in length, I doubt whether a more expeditious way could have been used. So much in extenuation of an instrument so unjustly relegated to oblivion. *M. M. Haas.*

MANAGEMENT OF SMALL AND TORTUOUS CANALS.

Dr. C. N. Johnson, Chicago, Ill.

All canals do not require to be drilled out and filled solidly to the apex to remain comfortable and satisfactory. On the other hand no man is doing his full duty who fails to make an honest effort to fill all canals that can be filled with a reasonable degree of skill and application, or who neglects to sterilize as perfectly as may be, every canal that he cannot fill.

When a hidden opening is found, the orifice should be sufficiently reamed out to give an indication as to the size and direction of the canal. A small stiff broach should then be used to explore the canal as far as possible, and when the broach refuses to go any farther after conscientious effort, it may be taken for granted that the caliber of the canal is so small that little or no trouble will supervene as the result of failure to clean beyond the point reached by the broach. An antiseptic should be worked well up in the canal by flooding the chamber and manipulating with the broach. Tortuous canals are followed to the best advantage by taking a small, freshly-filed, smooth broach of piano-wire, and curving it from time to time to follow the curve in the canal. There is little danger of breaking a broach of this kind in the canal, however much of a curvature it may have. In the attempt to fill such canals as these it is folly to use any material which is not semi-fluid on its entrance; something which cannot be pumped in position and worked into inequalities and interstices with the broach.

Cosmos.

ABOUT ENGRAVINGS.

Not every one who reads the newspapers and looks at the engravings in print, knows how they are made or what process is used in producing the different effects. The *Newspaper Union* undertakes to tell how the variety of kinds are produced :

A half-tone is made direct from a photograph, and is the closest possible counterfeit of the original that can be produced. It is not suitable for newspaper work, but works well on any supersized and calendered stock. An electro from this necessitates a separate operation, and the price of an electro does not include the making of the half-tone.

A zinc etching is made only after the subject is first plainly shown in black ink on white paper. Pen and ink drawings of original drawing subjects are indispensable, and may be made either from a photograph or other illustration. This drawing is photographed on zinc, the superfluous metal eaten away by acids, and an electro is made from the skeleton which is left. Price of the drawing and zinc etching is not included in the price of electro. Zinc etchings are suitable for newspaper work, and are inexpensive.

Woodcuts are made only by drawing on wood, and cutting out superfluous portions. They are necessary only for the finest work, not so good generally as half-tones, are slow to make, and expensive.

TEETH OF CLIFF DWELLERS.

Dr. J. W. Greene, Trenton, Mo.

Not long since I examined the skulls, and most of the mummified bodies, of twenty-six men and women who lived in the cliffs of Arizona and Colorado, it is said, more than five thousand years ago.

In the teeth there were only three characteristics different from what we should see in the same number of people now. In all but three cases the lower jaw protruded so as to bring the front teeth in direct occlusion, and give them the appearance of "double teeth all round." There was, in all these mouths, but a single instance of caries; this on an anterior proximal surface of a first upper molar. But "chemical abrasion" was present on the occluding surfaces of more than half of all these teeth.

The maxillaries were so short in most of these cases that the second molars reached their full length, and the "wisdom" teeth were yet hidden in the bone, never having been "cut."

To support a presumption that these people lived on vegetables there was no implement of the hunt found with them, though packages of seeds of different kinds were; and among them, pumpkin seed and Indian corn, identical with that of to-day.

Enough facts were gathered from numerous findings in the sealed tombs with these folks to make an interesting little book, but not, perhaps, appropriate in a dental journal.

But one thing strange, while these people knew nothing of metal for tools or weapons, they were up in some of the evidences of civilization. They had the "lost art" of weaving (not knitting) seamless water bags and baskets with picture designs in (not on) them, of the lint of the Mexican soap weed.

One woman seemed to have been a worker in hair, as she had with her quite a number of sample rolls, of various colors, even to "blondine."

THE PARTS THAT DO NOT GROW OLD.

In his work on the senile heart Dr. Balfour tells us that there are two parts of the human organism which, if wisely used, "largely escape senile or old age failure." These two are the brain and the heart. Persons who think have often wondered why brain workers, great statesmen, and others, should continue to work with almost unimpaired mental activity and energy up to a period when most of the organs and functions of the body are in a condition of advanced senile decay. There is a physiological reason for this, and Dr. Balfour tells us what it is. The normal brain, he affirms, "remains vigorous to the last," and that "because its nutrition is specially provided for." About middle life or a little later, the general arteries of the body begin to lose their elasticity and to slowly but surely dilate. They become, therefore, much less efficient carriers of the nutrient blood to the capillary areas. But this is not the case with the internal carotids, which supply the capillary areas of the brain. On the contrary, those large vessels "continue to retain their pristine elasticity, so that the blood-pressure remains normally higher than within the capillary area of any other organ in the body. The cerebral blood-paths being thus kept open, the brain tissue is kept better nourished than the other tissues of the body." Who is there among those who have reached or passed middle age that will not be rejoiced to find such admirable physiological warrant for the belief that the brain may continue to work, and even to improve, almost to the very last hour of life?

TO MAKE DIES FOR SMALL CASES WITHOUT MOLDING.

The method in brief is to cast the dies directly on the model which may be easily and quickly done, thus :

A plaster impression being taken, a plaster model is obtained. With the tip of the finger dipped in powdered soapstone rub the model till smooth ; build a wall of moldine (potter's clay mixed with glycerin) half an inch high around the model, covering the teeth and all parts not to be covered by the plate ; the parts to be covered by the plate will then be at the bottom of a well with sloping sides ; in this well pour lead till it is even full ; the lead should be poured just before it begins to cool ; separate this lead counter from the model, and around it build the wall of moldine as before, leaving exposed only the surface to be covered by the plate ; with a ball of cotton held in the pliers and dipped in powdered soapstone, dab the surface of the exposed lead till it is covered by a film of the fine dust ; in the well thus formed pour fusible metal, separate and swage as usual.

By this method no time is lost making sand molds, varnishing casts and waiting for them to dry, and the results will be found exact and satisfactory in every way.

D. W. Barker.

EDITOR ITEMS.—In your January number, page 17, there is an article entitle "Tin and Amalgam Filling" written by Dr. G. Chisholm, who claims that he never saw an amalgam that would save teeth under ordinary circumstances.

I must say that I am very much surprised to see that there is one in our profession who knows so little about amalgam. It is well known to the dental profession that amalgam will save teeth, and will save them where gold will not. The reason of Dr. Chisholm not having success is probably either that he had very poor amalgam to work with, or else that he cannot put an amalgam filling in properly.

Take a tooth with ordinary structure, remove all decay, break down frail edges, and take as much pains in preparing the tooth for gold, and your fillings will last quite as well as with gold. In soft or frail teeth, the best filling that can be inserted is a compound filling of cement and amalgam. Mix cement soft, place in cavity, and then insert amalgam while cement is soft. You then have a filling which appears from the outside to be all of amalgam, and will prevent discoloration of tooth and will also save it longer than any other kind of filling.

H. C. Hall, D.D.S.

ADVERTISING DENTISTS.

The young graduate who is just entering on the activities of his professional life, and who would be so ungrateful as to repudiate the examples and teaching given by his Alma Mater, would be considered unworthy of the school that created him, yet our dental colleges resort to methods of obtaining clinics which would give cause for expulsion of a member of a dental society. I observed while at school that to obtain patients for its clinics my professors advertised in the dailies of the city and weeklies of surrounding towns, that "The Dental Clinic will be open in the afternoons of each day, and open all day Saturday. Prices of work to cover cost of material." The response was flattering to the advertisers. Students are not only silently taught to advertise, but they are taught to use dishonesty in it also, for the schools charge for their clinic work from five to ten times the value of the materials. A dental college is a great professional institution. We must expect its examples, as well as its precepts. That which is professional and ethical in a great institution of learning, ought to be entirely admissible in those who are turned with honors from its doors

G. G. Brock.

Dr. J. S. Cassidy, at the last American Association, directed attention to the new antiseptic

FORMALIN.

This sterilizing agent, recently introduced from Berlin, though given a proprietary name, must not be confounded with quack nostrums, as it is a pure laboratory product, composition and method of production being well known. It is readily absorbed by water, from which it escapes as readily on exposure to higher temperature. As the gas escapes it may be absorbed by solids, as cotton, wool, linen, etc. It has been in use too short a time to pronounce positively on its action in the mouth, but from its known action on albumen it will doubtless be found valuable for sterilizing and permanently embalming the contents of inaccessible root canals. It cooks muscular tissue by one immersion, forming not a temporary coagulum but a homogeneous mass similar to horn, which is hard and insoluble and permanently sterilized. The yolk of egg is cooked by it, having the appearance of being very hard boiled, except that the sulfur in the yolk is not visible; no sulfuretted hydrogen is apparent. It is not poisonous, its taste is not unpleasant, and it does not corrode instruments. In a 1 to 3 per cent solution it will disinfect any decomposing fluid, such as broken-down pulp tissue, etc. It is readily absorbed by porous substances. Small tablets of plaster and sand or pumice form a convenient sterilizing medium, which, placed in the drawers with charred instruments, towels, etc., will keep them permanently sterilized. It promises much as a sterilizing agent for obscure root canals.

THE RELATION OF PREDISPOSING CAUSES (SO CALLED) TO THE ACTIVE CAUSES OF DENTAL DECAY.

L. C. Ingersoll, A. M., D. D. S., Keokuk, Iowa.

At the very portals of dental pathology we are confronted with the difficult problem of the etiology of dental decay. The subject is commonly presented under two heads—*exciting* and *predisposing* causes. The use of the term predisposing causes is open to criticism. The relation of causation to results is that of effective means acting to produce the results. Mere passivity cannot be a *cause*, for a cause implies activity adapted to produce definite results. Mere presence and passivity may be conditions affecting the operation of active causes, and such is the view that should be taken of what are commonly known as *predisposing causes* of dental decay. They are simply pre-existing bodily conditions, functional habitudes, peculiarities of internal structure or external forms which are favorable to the initiation and development of disease.

In approaching the subject of pre-existing conditions affecting dental decay, the greatness of the task of presenting a comprehensive view is at once evident and forestalling. I shall not, therefore, attempt it; for it would embrace a complete history of an individual, reaching back over many ancestral lines, inquiring into inherited idiosyncrasies, climate, habits and intellectual exercise, habits of diet, personal cleanliness, general environment, and the effect of every extraneous influence that could in any way enter as a factor in tissue and organic development.

Sufficient for my present purpose to know that every tissue of the body, whatever its general law of physiological development, has come to be what it is through various modifications of its typical nature and has received an impress peculiarly its own, derived from a great variety of sources. Hence it is that individual plants, animals and men, of a general class or species, have a nature *sui generis*.

In the midst of these modifications of typical forms and the peculiarities of structure and function we are thrown to discover the conditions favoring or restraining dental decay, and to learn, if possible, to what extent pre-existing conditions are responsible for the exciting or active causes of decay accomplishing their results.

It was a great step forward in accounting for dental decay when investigations were undertaken to discover the effect o

organic germs in the destructive work of disorganization. What had long been a mere presumption became a demonstrated fact—that micro-organisms are a potent factor in breaking down the hard-tooth structures.

Many became ready to renounce all other theories and demonstrations touching the subject, and to hail the new discoveries as so overwhelmingly proven that, in spite of the ridicule of some, the existence and working of micro-organisms in the teeth became the most interesting of all subjects presented before dental societies, and almost every member who had any love for investigation and experiment had his microscope, his incubating medium and culture tubes. And finding that millions of organic germs, vegetable and animal, had domiciliated themselves in the inner spaces and cavities of the teeth, he wondered that the whole human family did not at once succumb to the fate of King Herod of old, of whom it is recorded, "He was eaten of worms, and gave up the ghost." Every dental journal was so full of the talk about bacteria, that the germ theory was almost the only topic of conversation among intelligent dentists, and the influence of the teaching was so widespread and so deeply impressed that few thought of anything else in relation to etiology, whether pertaining to the hard or to the soft tissues, than the potent influence of bacteria.

The atmosphere was examined, and found to be full of sporadic germs. The water drank, whether at the quiet country home or at the city hotel, was pronounced to be literally swarming with living infusoria, perpetually multiplying by germination, and with astonishing rapidity. Carpets, upholstery and draperies were declared to be but hot-beds for the breeding of disease germs. Soiled hats, handkerchiefs and gloves were believed to hold in them the seeds of contagion. The market place was declared to be a place of danger. Contact with the people, and whatever a soiled human hand had touched, was thought to be infectious. A lecturer on physiology and hygiene, in the town where I reside, went in the market and bought butter, cheese and sugar, and placing samples on the platform of his microscope, exhibited to his auditors the active animal life disporting itself in the brown sugar, wriggling with an air of comfort in the cheese, or nestling with a home-like feeling in the butter, though nothing of the kind could be seen without the microscope. Many left the lecturer's microscope with disgust, and wishing to vomit up all they had eaten of butter and cheese for a year, and declaring that they would never allow another particle of brown sugar to enter their stomachs, though like articles of food had been harmlessly used in the family for many years.

The newspapers took up the report of the scientific journals

of bacteria finding a safe harbor in the mouths of people, undisturbed by pick and brush. Cases of inoculation by dental and surgical instruments were published with many terminal exclamation points. Misers were warned of their danger from the insidious microbe clinging to both coin and paper money, and all classes of people were inclined to look on money as "filthy lucre" indeed.

An influential employé in one of the largest dry-goods houses of Chicago, with an air of alarm and great earnestness, said to me that he never allowed himself to carry in his pockets any dirty money; then took out his wallet and showed me that it only contained fresh clean bills right from the Government press.

The tocsin of alarm was sounded in the last Congress of the United States by an appeal made from the floor of the Senate Chamber for an order from the Government that all soiled paper money should be burned and its place supplied with clean bills.

This wild alarm, this excited craze, would never have been created, had the exact truth kept pace with swift-winged error. The error was in the false conclusions hastily arrived at by the great mass of community, that all aerial and aqueous germs are disease-provoking, if not actually poisonous—that if organic germs have life at all, and enter with air, food and water in our bodies, they must be the cause of disease. Whereas, if it could only be known just how many kinds of organic germs are pathogenic in their character, the number would be found to be most astonishingly small compared with the countless millions that float in mist and air harmlessly around us, or innocently locate themselves in the fluids or in the more solid tissues of the body, and giving us vigor rather than doing us harm.

It is not strange, therefore, with all the talk and excited interest that has been aroused concerning the history, habits and work of bacteria, and the numerous demonstrations that have been given of their destructive work on human teeth, that the profession should overestimate the work of micro-organisms; forgetting, for the time being, the conditions that restrain the active working of bacteria.

There seems to be an abiding impression in the minds of some that if bacteria are found in the mouth, they must be destructive, and that prophylactic antisepsis is essential to prevent decay.

The chemical theory of decomposition in penetrating the enamel as a primary process of decay is accepted by bacteriologists. In fact, the chemical theory of the decomposition of the mineral portions of teeth must be accepted from first to last of the process of decay, the only change apparent being in the source of acid supply; in the one case it being from decomposition of

organic matter, resting on the surfaces of the teeth, and in the other case, the acid being elaborated by the bacteria. But why should it be thought necessary to abandon a theory of decay by vegetable and mineral acids chemically produced when accepting the theory of decay by acids produced by organic germs? It is chemical decomposition in either case, with the additional destructive work of the bacteria gaining their food supply by devouring a portion of the organic matters composing, in part, the substance of the teeth.

With this brief notice of the active agencies employed in disintegrating and dissolving tooth substances, let us inquire in the relation of, so called, predisposing causes to the exciting and active causes of dental decay. Is the relation such that when the active causes are present in the mouth decay of the teeth is inevitable? From what we know of oxygen, we know that when it comes in uninterrupted contact with base metals, it corrodes them. From what we know of the agencies that destroy human teeth, is it certain that their presence is a sure prophecy of tooth destruction? Are there any pre-existing conditions and tendencies that restrain active causes? Are these favoring or restraining influences inherent in the nature of tooth structure, or are they accidental and artificial?

We know that while metals, for the most part, are oxidizable, such metals as platinum, gold and aluminum are practically free from oxidation—that while common iron rusts with great rapidity, Russia iron, in the same circumstances, will be practically free from rust. The reason for this difference in the oxidizable tendencies of metals must be found in the nature of the metals themselves—a restraining and antagonizing element inherent in their composition. Disease is from without; antagonism to disease is from within; and the strength of the antagonism depends on the nature and functions of the tissue or organ. Different elements and in different proportions entering in the composition of substances make one substance to differ from another not only in its physical aspects, but in organic substances, a difference exists in the antagonism set up against destructive influences by life itself. The fact that organic substances do not exhibit the same antagonizing resistance in the presence of destructive influence from without is evidence of a difference of elementary constituents; while the greatest of the difference is created by vitality, which resists chemical decomposition, there is, wholly independent of life, a great difference in the material structure which invites decay. Because of this difference of material composition, one substance decays, while in the same condition and subject to the same

influences another does not decay. We see this illustrated in the mouths of individuals where there are some teeth that decay and others that do not decay; markedly, in the case of contiguous teeth—two molars for example. Their proximal surfaces are subject to the same influences; one tooth decays, while the other shows no signs of decay. Both acids and organic germs may fill the intervening space, and only one tooth be acted on while the proximal face of the contiguous tooth resists decay. No other account can be given of this difference except the difference in the quality of the tooth tissues.

[CONTINUED IN NEXT NUMBER.]

THE EFFECTS OF INTENSE COLD ON THE MIND.

Extreme cold, as is well known, exerts a benumbing influence on the mental faculties. Almost every one who has been exposed, to a very low temperature has noted a diminution in will-power, and often a temporary weakening of the memory. Perhaps the largest scale on which this action has ever been studied was during the retreat of the French from Moscow. The troops suffered extremely from hunger, fatigue, and cold—from the latter perhaps most of all. A German physician who accompanied a detachment of his countrymen, has left an interesting account of their trials during this retreat. We find that of the earliest symptoms referable to the cold was a loss of memory. This was noted in the strong as well as those who were already suffering from the effects of the hardships to which they had been exposed. With the first appearance of a moderately low temperature (about five degrees above zero Fahrenheit), many of the soldiers were found to have forgotten the names of the most ordinary things about them, as well as those of the articles of food for the want of which they were perishing. Many forgot their own names and those of their comrades. Others showed more pronounced symptoms of mental disturbance, and not a few became incurably insane, the type of their insanity resembling very closely senile or old age dementia. The cold was probably not alone responsible for these effects, for a zero temperature is rather stimulating than paralyzing in its action on the well-fed and the healthy. These men were half-starved, poorly clad, worn out with long marching, many already weakened by dysentery and other diseases, and all mentally depressed; as an army in defeat always is. It needed, therefore, no very unusual degree of cold to produce the psychic effects observed under other circumstances only as a consequence of exposure to an extreme low temperature.

STATE LAWS.

Alabama requires a Board of Examiners of five, elected by the Association. Diplomas or certificates of other States are not recognized. All must be examined. The fee is \$5. Any member of the board may grant a temporary permit. The board must prescribe a course of study for those who desire to study dentistry under private instruction. All certificates must be recorded.

Arkansas has a Board of Examiners of five, appointed by the Governor. Diplomas are recognized. The board simply pass on their validity.

California has a Board of Examiners of seven, appointed by the Governor. Before whom any may appear; the board indorses as satisfactory diplomas from any reputable dental college. The examination fee is \$10. All certificates must be registered with the county clerk, the fee for which is \$1. All fines collected go to the school fund.

Colorado has a Board of Dental Examiners of five, appointed by the Governor. The time and place of meeting is optional with the board. All who apply for a license must either have a diploma from a reputable dental college or a certificate from the Board of Dental Examiners of some other State. Neither a diploma nor a certificate will exempt the holder from an examination, the examination fee is \$10. Temporary permits issued by the Secretary.

Connecticut has a so-called dental law; no board, no examination, no fees. Diplomas or certificates will admit to practice without examination.

Delaware has a Board of Examiners of five, appointed by the Governor. Diplomas are recognized; no fee for examination; \$1 for the certificate; any person may go before the board.

The District of Columbia has a dental law, recently passed.

Florida has a good dental law, requiring a Board of Examiners of five, appointed by the Governor. Only those having diplomas are allowed to practice, but diplomas do not exempt the holder from examination. The duty of the Board is to grant certificates to all applicants who have obtained diplomas from a reputable dental college, and who pass a satisfactory examination. The fee is \$10.

Georgia has a Board of Examiners of five, selected by the State Association. Diplomas are not recognized; all persons may go before the board; any member of the board may issue a temporary permit, all must register with the Clerk of the Superior Court. There is no fee for examination. One-half of all fines collected go to the informer, the other half to the school fund. All dentists are exempt from jury duty.

Indiana has a Board of Dental Examiners who are appointed as follows: The State Dental Association elects three, the Governor one, and the State Board of Health one; diplomas are recognized; the examination fee is \$5.

Iowa has a Board of Dental Examiners of five. Diplomas are recognized; the fee is \$2; any person may go before the board.

Illinois has a Board of Examiners of five. Diplomas are recognized; medical diplomas will admit the holder to examination; the fee for certificates for graduates (without examination) is \$1; all others \$2. By this law the fees of the Board of Examiners is fixed at \$5 a day, with traveling expenses.

Kansas has a Board of Dental Examiners of four. None but graduates of reputable dental colleges are admitted; certificates of qualification from other State Boards of Dental Examiners are not recognized; applicants must have a diploma from some dental college. The board receive \$5 a day and all legitimate expenses.

Kentucky has a Board of Examiners of five, elected by the State association. The President and Secretary of the State Dental Association are elected to their respective offices and as members of the Board of Dental Examiners at the same time; three additional examiners are then elected by the Association. The State Associations control everything, and all certificates are issued in their name; diplomas are recognized; the fee is \$20; all money is turned over to the State Association.

Louisiana has a Board of Dental Examiners of five, elected by the Association. Diplomas are recognized; two members of the board may grant a temporary permit; violators are indicted by the grand jury of the county in which the offense was committed; of the fines collected one-half go to the State Dental Society and the other half to the school fund; no fee.

Maine has a Dental Board of five, appointed by the Governor. Diplomas are not recognized; any person may go before the board; all must pass an examination in anatomy, physiology, pathology, therapeutics, chemistry and the theory and practice of dentistry; the secretary may grant temporary permits; the fee is \$20.

Maryland has a Board of Examiners of five, appointed by the Governor. Diplomas are recognized, and holders do not have to pass an examination; any person may go before the board; any member of the board may issue a temporary permit; the fee is \$1; and fines collected go to the school fund.

Massachusetts has a Board of Examiners of five, appointed by the Governor. Diplomas are not recognized; any person may go before the board; the fee is \$10; the examinations are either

oral or written, at the option of the applicant; the board receive \$5 a day and three cents a mile each way.

Michigan has a Board of Examiners of three, appointed by the Governor. Diplomas are recognized; any member of the board may issue a temporary permit, and may also appoint a substitute to act in his absence; the fee is \$13, \$3 for the temporary permit and \$10 for the certificate.

Minnesota has a Board of Examiners of five, appointed by the Governor from ten persons selected by the State Dental Association. To be illegible for examination, the applicant must have a diploma or ten consecutive years of actual practice. The fee is \$10. The examinations are written, and are provided for by law as follows: Anatomy, physiology, chemistry, materia medica, therapeutics, metallurgy, histology, pathology, operative and surgical dentistry, mechanical dentistry and demonstrations of their skill in operative and mechanical dentistry. Every dentist practicing in this State must register every year, the fee for which is \$1. The board is incorporated. All fines collected go to the school fund; Justices of the Peace, and the respective municipal courts shall have jurisdiction over violations of this act. This law has been carried to the Supreme Court and has stood the test.

Mississippi has a Board of Dental Examiners of five, appointed by the Governor; diplomas are recognized; the fee for graduates is \$2, others \$5; certificates must be recorded; the minimum fine is \$10, unlimited the other way. Diplomas not recognized.

Missouri has a dental law, but no Board of Examiners. None but graduates of dental colleges are permitted to practice. The diploma or a certified copy must be filed with the Clerk of the County Court, or if in St. Louis, with the City Register, a certificate is issued by the clerk or register and recorded; the fee is \$1.

Montana has just passed a dental law.

Nebraska has a dental law without a Board of Examiners; none but graduates of dental colleges can practice in this State. The diplomas must be recorded by the County Clerk.

New Hampshire requires a Board of Censors of three. Diplomas are recognized; the fee is \$5.

New Jersey requires a Board of Examiners of five. Diplomas are recognized. By the new law the Board of Examiners is changed to the Board of Registration and Examination in Dentistry. The State Dental Society recommends to the Governor five dentists of good repute, whom the Governor appoints; and no person is examined unless he is a graduate or the holder of a diploma of graduation from a dental college recognized as in good repute, or has studied with a reputable dentist for five years continuously

in this State. The fee is reduced to \$25, and half of all fines collected go to the board, the other half to the State.

New York has eight district dental societies corresponding with the eight judicial districts of the Supreme Court. Each of these district dental societies appoints a Board of Censors of three or five, called the District Board of Censors. Each of the eight district societies elects annually eight delegates (who at the first meeting organize a State Dental Society), and who are known as delegates to the State Dental Society. The State Dental Society elects eight censors—one from each District Society—who constitute the Board of Censors. The Board of Censors of the several districts examine all persons who present themselves for examination, and report, in writing, to the President of the District Society, who issues, on the recommendation of the Board of Censors, a certificate of qualification to such person, countersigned by the Secretary and bearing the seal of the District Society. The fee for this is \$10. The State Board of Censors examine all who hold district certificates, and report their opinion, in writing, to the President of the State Dental Society, who, on the recommendation of this board, issues a diploma conferring the degree of Master of Dental Surgery—M.D.S. The fee for this is \$20; this degree is optional; a certificate from the President of any of the eight district societies permits any person to practice dentistry in New York; all must register; the fee for which is fifty cents; diplomas of reputable dental or medical colleges are recognized; the State Society has the power to determine as to the reputation of the college.

North Carolina has a Board of Examiners of six, elected by the State Association; diplomas were recognized by the original act; but are not recognized by the amendment; all must pass an examination, except regularly authorized physicians and surgeons. Every certificate must bear the seal of the State Society; there is no fee; any member of the board may issue a temporary permit.

North and South Dakota require Boards of Examiners of five. Diplomas are recognised, but all must pay the examination fee, which is \$10, and an additional registration fee of \$5. This registration certificate entitles the holder to registration, which he must do annually, the fee for which (after the first year), is \$2; the fees are, therefore, \$15 for the first year and \$2 a year thereafter. Any member of the board may issue temporary permits.

Nevada has no dental law.

Ohio has a dental law, but no Board of Examiners. All who practice dentistry must have a diploma or certificate of qualification from the State Dental Society. All prosecutions are by in-

dictment before the Court of Common Pleas, and all fines collected go to the school fund; there is no fee.

Oregon requires a Board of Examiners, appointed by the Governor. Diplomas are recognized and holders are granted certificates without examination on payment of a fee of \$5; all others \$10. All must go before the board.

Oklahoma has a Board of Examiners of five, appointed by the Governor. Diplomas are recognized. All must go before the board and pay \$10. Holders of dental diplomas are not examined.

Pennsylvania has a Board of Examiners of six, elected by the State Dental Association. Nothing but a dental diploma will admit to practice in this State. The fee under the original act was \$30; by the amendment there is no fee. Certificates from other State Boards are not recognized. All prosecution is by indictment, and all fines collected go to the poor fund.

Rhode Island has a Board of Registration of five, appointed by the Governor. None but graduates of dental colleges are admitted; the fees are \$27—\$2 for examination and \$25 for the certificate; graduates are not examined.

South Carolina has a Board of Examiners of five, elected by the State Association. Diplomas are recognized and holders are admitted without fee, charge or examination; all others must pass a satisfactory examination, the fee for which is \$15; all must become members of the State Association. Every dentist in the State must keep a record of every case in duplicate, and furnish a copy to the patient if desired; all prosecutions are by indictment before the Grand Jury; all fines collected go to the school fund.

Tennessee has a Board of Examiners of six, two from each of three subdivisions of the State—East, Middle and West—Tennessee, appointed by the Governor. Diplomas are recognized; all others must pass a satisfactory examination; the fee is \$5.

Texas has a Board of Examiners of three, appointed by the judges of three judicial districts. Diplomas are recognized, but all must go before the board; the fee is \$5; any member of the board may grant a temporary permit; all fines collected go to the school fund; all certificates must be recorded in the respective counties.

Vermont requires a Board of Examiners of five, appointed by the Governor. Diplomas are recognized, and no fee or examination from holders is required; for others the fee is \$5; all certificates must be recorded; any member of the board may grant a temporary permit; the board receives \$3 per day and no mileage.

Virginia has a board of Examiners of six, appointed by the Governor. Diplomas are recognized; all others must be examined; the fee is \$10; all fines collected go to the school fund.

West Virginia requires a Board of Examiners of twelve, appointed by the Board of Public Works, four from each Congressional district. Diplomas are recognized; all others must be examined, the fee for which is \$24, \$2 to each member of the Board.

Wisconsin requires a Board of Examiners of five, appointed by the Governor. Diplomas are recognized; all must go before the board; graduates are not examined; the fee for them is \$1, for others, \$10.

Washington requires a Board of Examiners of five, appointed by the Governor. Diplomas are recognized; all must go before the board, but no examination for graduates; the fee is \$25 for all classes; all certificates must be registered; two members of the board may issue a temporary permit.

Wyoming has a dental law, without a Board of Examiners. None but graduates of dental colleges can practice dentistry in this State. A copy must be filed with the County Clerk of the County, under oath. The Clerk of the County gives a certificate, with the seal of the county attached; no fee, unless to the County Clerk.

WHY PEOPLE BECOME DEAF.

It has taken the medical world a great many years to discover that the loss of hearing is almost invariably caused by some disease of the throat or nose, or both. But very recent researches in these fields have demonstrated this fact beyond question, and it is now admitted by more advanced medical men that, aside from the rupture of the ear drum, there is scarcely a symptom of defective hearing which is not traceable directly to the condition of the nose and throat.

In view of the new discoveries, ear specialists are finding their occupation gone, save as they make their particular branch an assistant in further investigation. It is said, as we have already pointed out, that the use of smelling-salts is one of the most prolific causes of deafness, operating by weakening the olfactory nerves, and through them the auditory system. All strong and pungent odors should be avoided as far as possible, especially those which act on the secretory processes, and, as the popular expression goes, "make the nose run."

Medical Brief.

The dental office should not be a place for the familiar gatherings of friends for gossip, gaming and discussions. It is annoying for a patient, especially for a lady, to find any one sitting about who does not belong there.

CURRENT THOUGHTS.

TREATMENT OF PULPLESS TEETH HAVING NO FISTULOUS OPENING.

Dr. C. N. Johnson, Chicago.

In the treatment of teeth with pulps dead but with no fistulous opening, where there is any doubt as to whether a blind abscess exists it should invariably be treated as if there were one. The most expert operator cannot always determine in advance whether he has a case of blind abscess or simply a putrescent pulp-canal with no complications beyond the apex, and it is only common justice to the patient to proceed in the most cautious manner. In fact, these require the most careful management of any form of pulpless teeth.

There are two principal conditions calling for treatment under this head: Where pulps have died under fillings or in sound teeth, and where decay has exposed the pulp and caused its death. In the former the operator must drill in the tooth to gain access to the chamber and canals, and in this connection one precaution seems always necessary. Formerly these frequently resulted in much trouble to the patient and chagrin to the operator, through the fact that teeth which, previous to the interference on the part of the dentist, had been perfectly comfortable, immediately took on inflammatory action and often ran to a distressingly bad abscess. The precaution necessary to avoid such a result relates to thorough antisepsis from the very beginning of the operation. The rubber-dam should be applied before any drilling is attempted, and an antiseptic placed near at hand for immediate use the moment the pulp-chamber is penetrated. This antiseptic should be non-irritating and non-effervescing. It should be a non-irritant, because irritation either medicinal or mechanical is dangerous, and it, above all other things, should not be an effervescing agent, because the very act of effervescence is too likely to force septic matter lying in the canal through in the apical space. The least disturbance we set up in the apical third of the canal at this first sitting the greater our chances of avoiding trouble, and I am much opposed to the practice advocated by various writers of using hydrogen peroxid, pyrozone, or similar agents thus early in the treatment of pulpless teeth having no fistulous openings.

As soon as the chamber is reached by the drill, it should at once be flooded with the antiseptic, care being taken not to cause

any pressure on the contents of the canals. The slightest particle of septic matter forced through the apical foramen at this stage of the operation may cause serious trouble. When the antiseptic has had time to mix somewhat with the contents of the chamber, a bit of absorbent cotton or bibulous paper may be lightly applied to the opening to absorb enough of the antiseptic to admit of drilling to enlarge the opening. The absorbent will usually bring away some of the putrescent contents of the chamber in addition to the antiseptic, and when the opening is sufficiently enlarged the chamber may repeatedly be flooded, and the contents absorbed in this way till the greater part of putrescent matter has been removed from the chamber and larger portion of the canals without causing disturbance at the apical foramen. When this process has been carried to the limit of safety, the cavity is flooded with absolute alcohol for its dehydrating effect, and this evaporated to dryness. This step in the operation seems to the writer to be of the utmost importance. It must be manifest that the dryer we get the canals the less chance there is for micro-organic life to exist, and that when an antiseptic is applied the greater will be the amount taken up by the tubuli. Care should be exercised, however, that the crown of the tooth be not heated too hot in the process of drying the root, and that it be not kept dry too long, for fear of injury to the tooth-structure through checking. It is with this possible danger that I have nearly abandoned the use of hot air in these cases and substituted the alcohol spray. It seems to extract moisture from the canals without heating the tooth perceptibly. This danger to the crown of the tooth may also be considered an argument in favor of the use of the root-canal drier whenever it is found practicable, and wherever it is felt that there is no danger of causing apical irritation by its use. When dryness of the canals is obtained, they should once more be flooded with an antiseptic, this time to remain sealed in the cavity till the next sitting. The canals are left filled with the medicament, but no cotton is forced in them at this time. A small pledget saturated with the antiseptic may be placed loosely in the chamber, and the opening closed with gutta-percha.

If the operation has been carried through thoroughly and carefully, and if the putrescence seems to have been overcome by the treatment, dismissed for one week, with instructions to return at once if trouble ensues. Where any doubt is felt as to the degree of control obtained, the patient should be seen in twenty-four or forty-eight hours, and the dressing changed. At the end of a week, if no symptoms of irritation have been felt, and if the canals are sweet and clean on the removal of the dressing, the roots may

be filled. Before this is done, however, the canals should first be washed out with alcohol, dried, flooded once more with an antiseptic, wiped out, flooded with alcohol, and dried. They are then ready for the filling.

Where the pulp has died as a result of exposure from decay, and the canals have for long been subject to septic influence, the same general treatment may be followed, with the one slight variation that in extensive decay, with much infected and softened dentine remaining, the softened portion may be burred out or removed with excavators, and washed away with a syringe before the rubber-dam is applied. In this way much filth may conveniently be gotten rid of by way of the spittoon without the operator coming in too close contact with it.

In treating where there are no fistulous openings, if the dressing after the first treatment shows indications that there is a blind abscess through a weeping of pus in the canal, the treatment should be continued till all such weeping stops and the abscess heals. In chronic, persistent blind abscess, where large quantities of pus flow in the canal and flood the entire cavity on removal of the dressing, the treatment is to remove all of the pus possible by absorbing with cotton or bibulous paper, and by "coaxing" with a broach. When pus is flowing in such profusion it is an indication that the apical foramen is large, and there is less danger of causing irritation by the use of the broach in this region than in ordinary canals without a flow of pus. It is therefore advisable to manipulate with the broach quite freely in the attempt to empty the abscess of all pus, and sometimes desirable to carry this manipulation to the point where pus stops and blood begins to flow. When the operator succeeds in getting a good flow of blood, he may then wipe the canal with a broach wrapped with cotton and dipped in some non-irritating antiseptic, and when the canal is sufficiently free from blood, it may be packed to the apex with cotton saturated with the antiseptic. This should be allowed to remain a week undisturbed if it causes no uneasiness. Nature should be given time to repair the injury, and nature will very often do much for us if we give her the opportunity. This is where much harm is often done by over-treatment.

If a tooth in this condition will remain tightly packed for a week without trouble, and if the canal is dry and the dressing sweet on removal, the root may be filled.

Cosmos.

A few days ago a lady came in my office with this inquiry :
" Doctor, do you give this fertilized air." *O. F. Brigham.*

THE PREPARATIONS OF PYROZONE.

Dr. I. N. Carr, Tarboro, N. C.

Since the preparations of pyrozone are now being so generally used, I would like to suggest a few thoughts in regard to them. First, as to the care that should be exercised in opening a tube of either the 5 or 25 per cent to avoid explosions: Place the tube on a block of ice for a few minutes, and hold it in a wet napkin while grinding off the end. Second, to keep it from evaporating after transferring to a glass-stoppered bottle, first coat the stopper with vaselin and insert, then melt paraffin and pour over it. This is the only way I have found to preserve it after once opening a tube. Now, in regard to using them. Of course the soft tissues must be protected by the rubber-dam, and the face and eyes well protected when the spray is used from a pyrozone atomizer. In using these agents for bleaching, care should be taken that the greater part of the root should be hermetically sealed, or else atoms of oxygen will pass through the apical foramen and cause considerable pain after the tooth has been filled. I prefer to seal the root with the best quality of cement and give sufficient time for it to harden, as where the rubber or gutta-percha stopping is used the ether will penetrate to some extent by softening and dissolving it; at any rate, trouble is very apt to occur if the cavity is immediately filled after using this kind of a root stopping. Your patient will sometime return with the tooth quite sore, and "quivering." Of course when used to evacuate pulp canal contents, it does not matter how far it may penetrate, as the loosely held atoms of oxygen will exert their force at the point of least resistance, which, of course, is in the direction of the cavity, and after pus has ceased to discharge, by simply spraying canals with 3 per cent pyrozone, then drying thoroughly with absorbent cotton and hot air, the tooth may be immediately filled, though I think it safer to use a 50 per cent solution of sodium peroxid, if you wish to practice immediate root filling, or Dr. Schrier's preparation of sodium and potassium, both of which have proven entirely successful in my hands for nearly two years. The pyrozone used with the atomizer will cleanse the chamber and canals, as well as tubuli of dentine more quickly than anything I know of. Of course, judgment and care should be exercised in the use of either of the compounds mentioned, and great caution, and no operation should be begun on the teeth, when they are used, till the rubber-dam has been first thoroughly adjusted.

NEURALGIA.

Henry Blandy, L.D.S., Edin.

When a dentist speaks of neuralgia, he means a nerve pain of a more extended character than odontalgia, or toothache. When a patient complains of pain of a shooting character in the head, the ear or arm, we say he has neuralgia; we examine his teeth carefully, and we generally find a decayed tooth, or teeth, or stumps, which indicate the locality of the nerve lesion which gives rise to the pain. We remove the decayed tooth and we generally cure the patient.

Some little time ago I had a lady patient who had suffered severely from neuralgia in the head; she had been under treatment by a physician for many months; she had been to Smedley's Hydro. for nine months to get up her general health and tone; she had had a course of massage, I suppose on the same principle that muscular rheumatism would be treated, and which is treated effectually in that way—but with no improvement. The racking sleep-destroying pain still continued. She did not believe it could be her teeth, but came to have them examined as a forlorn hope.

There was an upper wisdom tooth decayed, but I diagnosed the lower wisdom as the offender, which was apparently quite sound. This tooth was very sensitive to hot air applied by the hot air syringe, and to cold water. But she declined to allow me to extract it, and decided to have the upper tooth out. It was decayed, and of no great value, so against my advice I took it out. In a week or two she returned; there had been no improvement. Had the upper wisdom tooth been a sound and useful tooth, or been capable of being made in one filling, I should, of course, have refused to extract it. I look on the dentist as the arbitrator between the patient and his impatience. The one is a professional and the other an amateur. The proverb "Every man knows where his own shoe pinches" does not hold good with regard to teeth. On this second visit I was able to get my way, and extracted the lower wisdom. I found the nerve cavity full of pus. We all know how painful a simple gathering on the finger may be when the finger swells, and there is heat and great congestion. The tooth cannot swell, and we get the congestion in the confined pulp chamber, consequently there is compression of the delicate nerve filaments, and we get extreme pain. But the pain may not be localized to the tooth, and we get what we call reflex neuralgia. Neuralgia might also be caused by the deposition of secondary dentine in the pulp chamber.

Neuralgia which may sometimes be relieved by dressing the cavity in some tooth—destroying the pulp, clearing it out and filling it. A young lady came with intense neuralgia, saying she thought she would go mad. She paced up and down the surgery, and demanded almost instant extraction of an upper lateral tooth. This was the only decayed tooth she had, and would have left an unsightly gap, and she would have had to be bothered by a plate for one tooth. I injected morphia in her arm and dressed the cavity—destroyed the nerve and eventually filled the tooth with gold, saving it for appearance and mastication. A gentleman brought his doctor to give him an anesthetic to have an upper molar out, which I stoutly refused to extract, though under threat that he would go elsewhere, and find a dentist more amenable to reason. But he gave way and I saved that tooth.

Another obscure case of neuralgia is the malposition of teeth. A medical man of 50 years complained of great pains all over his head. He dare not take chloroform or even gas. I believed the trouble to be in the upper right cuspid, under which was a large swelling. I injected cocain and went for the stump, but the instrument slipped and I failed. I went deeper and failed again. Then with my saw edge forceps I trephined till I had a very firm hold, and it took a long and strong pull, but when it came I found I had a large cuspid which had never been erupted. It was lying nearly horizontally in the aveolus. The other case was nearly similar, in a patient of 45, whose cuspid was under sound bicuspid.

A third of malposition, causing great neuralgic pain, was that of the wife of a coachman, aged about 45. She had no bad teeth, and apparently a healthy mouth. All her teeth were present except the left upper wisdom. The second molar was decayed in the crown. I carefully tapped this—she winced. On extraction I found the palatal root broken off nearly to the neck. The fracture was not flat and even across, but slightly cupped, evidently not fractured but absorbed, as the roots of temporary teeth are. To prove this I immediately extracted the wisdom tooth, which was underlying, and it fitted exactly the second molar palatal root. The same thing sometimes occurs with lower wisdoms, which will burrow under the gum and eat their way in the pulp chamber of the lower second molar. I have the following notes in my hospital case book for last year. Mrs. R., 34, neuralgia 11 years; use of arm gone for 3 or 4 years—3 or 4 days at a time—had not been able to attend to her hair for 5 years. I extracted teeth. Three weeks afterward she was better and had regained the use of her arm.

Salter gives a case where the right arm was seriously affected—became nearly powerless, and was constantly in a state of aching

pain—the patient could hardly grasp or hold anything in her right hand. Facial palsy occurred with dimness of the right eye. A week later she had complete facial paralysis, deafness, and her right arm as above. Upper right wisdom tooth removed. Before patient left the house pain of arm and powerlessness had vanished. Patient quite cured in a fortnight.

Dental Record.

TREATING PULPLESS TEETH.

Dr. Frank Abbott, New York.

In World's Columbian Dental Congress.

How shall we treat teeth after the pulps are dead so as to avoid pain; how can we best avoid everything that shall give trouble to our patients? That is a question that has troubled us for many years. For a number of years I have had a practice that seems—I judge from what has been said in reference to it—to be rather unique. I never depend entirely on the application of an antiseptic in the buccal roots of molars or the small roots of bicuspids in the upper jaw, but I depend on a material which I force in and around such pulps, if any portion is left in the canals, which is combined with an antiseptic strong enough to answer the purpose, I virtually mummify it.

I have many pulpless teeth to treat, as of course all have who are in full practice, and I treat them all in the one general way. That way is to open the tooth as carefully as I possibly can, opening the pulp chamber so that I may cleanse every particle thoroughly, and get directly in all the root canals. Then, with a small syringe, use one in ten thousand solution of bichlorid of mercury (a grain of bichlorid of mercury in twenty ounces of water), and syringe these canals as thoroughly as I can, and with a broach, a small instrument that I can apply back and forth in the canals as far as I am able to go, stir up the contents of the canals, and then wash again, and so on; stir up and wash till I am pretty sure everything is clean, so that the substance coming out of the tooth as it strikes the white napkin would show you a white, clean color instead of a stain. I conclude that I have washed it thoroughly clean, and then I fill it with oxchlorid of zinc, in which I put one drop of one in two thousand of bichlorid. Thus I combine the antiseptic properties of bichlorid of mercury with the penetrating and antiseptic properties of bichlorid of zinc, and the oxid of zinc forming a cement by process of crystallization. This is the material that mummifies or holds the substance that is left in the roots of teeth in a condition to give no trouble, and

instead of opening the tooth and treating it from day to day for a week or ten days, I open a tooth and fill it at the same sitting always, unless I have periosteal irritation—soreness of the tooth, as I touch it. If that is absent, and the tooth is in comparatively good condition, I fill it at once; filling with gold or any substance I wish, and dismiss the patient after painting the gum with a solution of concentrated tincture of aconit and tincture of iodine. It is a powerful counter irritant, and does the work of relieving the pressure of blood around the root of the tooth.

This, to me, is the simplest, easiest, most quiet method of getting along with that kind of teeth. Should we leave them open, what do we do? We open the root of a tooth and cleanse it with antiseptics as thoroughly as we like, and the contents of the canaliculi in the substance of the tooth itself remain. Decomposition takes place and the gases of decomposition are all the time forcing themselves in the pulp canal. They cannot get out through the sides of the root because the cement on the surface will not permit it, consequently all the openings in that direction are closed except what might be taken up in the circulation; and if there is a bit of cotton in the crown of the tooth that gas does not come out through it, the result is the pressure at the end of the root, caused not only mechanically, but by the poisonous effect of the gas produced by this decomposition. We must bear in mind that the result of decomposition is what we have to deal with, and not the decomposing process; not the organisms that produce decomposition, but the material produced by the presence of the organisms.

AMALGAMS—THEIR USES AND ABUSES.

A. C. Hewitt, M.D., Chicago, Ills.

It needs no argument to prove to those who may chance to read this article, that dental amalgams have their uses. Nor is it necessary to argue that dental amalgams are abused. There is not a dentist by natural ability and special education equipped to practice his profession, with experience gained by an inspection of a hundred mouths, who will question either proposition. That the abuse is wide spread, and the victims to be numbered by the thousands and among the rich and educated, quite as often as with the poor and ignorant, is equally the shame and dishonor of the dental profession.

There seems to be a "Boston Rubber Conscience" governing the dialectics of many dentists, when they reason on the subject of amalgams and their uses. Their rules and modes of reasoning

and practices, their logic applied (with a little more rubber) would justify the footpad and highwayman. Two cases will illustrate what I mean :

Some years since I chanced to visit the office of a leading dentist in a neighboring city. Immediately after me there came a young woman to have a tooth filled. The doctor commenced work at once, asking me not to leave. By a few strokes of an excavator, not even a "wipe out" with absorbent cotton, no antiseptic agent, no coffer dam; a lower molar was prepared for filling. Pouring some alloy in the palm of his hand from a white glass bottle, clear to the light, he amalgamated the alloy; squeezed the resultant mass between his thumb and finger, and "stuffed" the amalgam in the cavity, wiping the surplus away with his thumb, named two dollars as his fee, caressingly folded the bill paid and put it in his pocket. The proceeding did not occupy more than five to eight minutes. After the patient left I inquired, "Do you not use the dam in filling with amalgam?" "Oh, no," he answered. "I just hoe out the cavity and slap in the amalgam." I said: "But such a filling will only last a short time." "I know it, but she will come back and I will get another two dollars:" I cannot write out the chuckle emphasizing the rejoinder.

Four days previous to the date of this writing, a young woman came to my office for some dental work. A brief examination revealed results of such work as just described. Eleven cavities containing plugs from what I judged to be "white alloy," and out of the eleven not one sufficiently filled its cavity to allow successful patching. Three of the teeth had dead pulps and open fistule. I inquired how long since the fillings had been inserted. She replied "A little more than a year." Her teeth were fair sized, well formed and in good position.

Another case (an interruption while writing the last above). A young lady about twenty-two years of age, called to see if I could fill a front tooth with gold. Noting my surprise at her question, she explained that her dentist said her tooth would not hold gold. Looking at her teeth I saw two lower ones filled with amalgam. Both fillings were defective, one so much so that I easily passed a broach beside the plug to the bottom of a rather deep cavity. The other was only held in place by gravitation and wedging particles of food. I learned that the two fillings had been inserted about three months previously. They were "white alloys" amalgamated, but utterly worthless as tooth preservatives. A strange part of her case was that the same dentist had "bridged" in a couple of superior bicuspid quite artistically and durably.

But why multiply cases? I doubt if there is a dentist that will read this article but could multiply the three cases cited by almost any numeral, and then the half not be told. Dentists know that the large majority of amalgam fillings are faulty. I had almost said dismal failures as preservatives. Are they necessarily so? By no means. A careful scrutiny of any number of faulty fillings (amalgam) will reveal the cause of their worthlessness. In some portions of most of them there is solidity, close adaptation to dental walls and sufficient density. But like an anchor chain with a flawed link, they are a delusion. The fault does not lie in the alloys, but in the amalgamating and manipulating; the *lazy*, *shiftless*, *dishonorable* and *dishonest* workmanship. Herein lies the abuse. There are honorable men in our profession whose daily and yearly work prove what I say.

Without such workers amalgam could not have driven back its enemies (pretended friends being the worst) and maintained the rank it now securely holds.

When Prof. A. O. Hunt, of the Dental Department of Iowa University, demonstrated in his clinic before the Chicago Dental Society, a few years since, that no more free mercury could be brought to the surface of his work; he gave the unanswerable argument in favor of the use of amalgams, and an object lesson revealing its abuse.

Everybody knows that free mercury is not a good preservative of tooth structure. Prof. Hunt taught how to divest the amalgamated alloys of their mercurial supersaturation and brushed aside the fine spun theories of "spheroidal tendency" of amalgam, crevicing around an amalgam filling, bulging of its surface, tendency to spherical form, ovoid tendency, etc., and demonstrated that if the superfluous mercury were gotten rid of and the mass packed so that equal density prevailed throughout and left to crystallize in that position, it would not "hump" or "globulate."

Could Dr. Hunt so condense amalgam in a tooth in the mouth without the aid of a coffer dam or some other method of dryness? If not, then no further argument is needed to point out one abuse of amalgam, namely, "submarine working." Another abuse is nearly or quite universal.

Review.

Be strict in fulfilling your engagements. Few things are so detrimental to business as repeated disappointments. Sometimes they cannot be helped, but generally they are the result of negligence, forgetfulness, or habitual inattention to business. The time of your appointments belong to your patients, and should be conscientiously kept for them?

RECURRENCE OF DECAY AT THE CERVIX.

Prof. J. Foster Flagg.

You all admit that recurrence of decay at the cervical border gives you the greatest difficulty to surmount, and as yet you have not reached the cause nor the remedy. It must be admitted that if this one thing can be mastered, we have overcome our most powerful foe.

It is a fact not to be denied that every dentist cries out for some method to prevent recurrence at the cervix. This is positive proof that ever one has hands full of proximal cavities from the cuspid back. Every one must admit that contour fillings have been the only help or partial cure, though it has to be repeated or requires patching.

A case presents where caries has run wild. Not a proximal surface scarcely but is involved. No pulps quite exposed, but threatening. Every tooth has been filled and refilled, and by more than one dentist. Contour has been attempted. Where the fillings of gold remain they are so undermined there is nothing but utter annihilation unless all are removed. The teeth from their loss of proximate surfaces are all out of articulation, which can be best seen by taking an impression and putting the casts in my articulator. Look closely at the cervix, and you will find the root of each so close that no thread can be forced through, and the decay is far up under the cervix. Look further and probe for the alveolar process, and not a vestige of it remains for a quarter of an inch up. Look also to the second molar where the first has been extracted, and on that side the process is gone far down and nothing but loose gum tissue remains, and is constantly receding, and wherever a tooth has been lost the process about the cervix absorbs as the body of the jaw absorbs.

In this state of affairs you put on your dam and separator, and you obtain a slight widening, and at once fill permanently the excavated tooth. No attention is paid to the articulation of the teeth. You have no desire to wait, and you rush on headlong to fill and get your pay. The rest of the teeth are left without anything in them, till one by one you have had your patients at least twice a week for months, two hours or more at a sitting, till they are exhausted and condemn dentistry, and while you are rushing through to complete every cavity with a filling, you have done nothing to prevent further rapid decay, and pulps become exposed and patients have to suffer.

I know this is the case with nearly every man's practice. I

see it every week, and I know from personal contact in conversations with patients of others who have not come for treatment.

You can do better than this, and not only retain your patients, but bridge over time as well as space, and fill at your leisure.

I will take the same mouth just illustrated, and without placing in one single permanent filling of any kind of metal, treat it with pink gutta-percha alone, with a little of the white as a facing, where necessary. I cut out only partially the cavities on one side of the jaw, always exposing every grinding surface where the proximal is gone, and make compound by running all of the cavities in one, seldom leaving any proximal cavity to stand alone, but opening it in the grinding surfaces. This is a cardinal principle with me. There is one surface or border I complete at once, and that is the cervical, so that I never have to touch it again, and this I cut so far up as to not only remove all caries, but where I know the gum and process will grow up and over it. This is finished, and to enable me to do so, I forgot to say, I never put on the rubber-dam in any case till I fill permanently, when the cervix is firm and will admit of its adjustment. It is easy to stop the blood with perchlorid of iron, creasote, or any styptic.

And now for the further treatment. In all the spaces I have made I place great pieces of pink gutta-percha, and, with no separation between them stuff the whole intervening space, trim and let alone. This I do till every place is filled in. I dismiss the patient, and have him call in three or six months or a year, as I may please; and, as I find the teeth wide enough apart for a plus-contour filling, and the alveolar gum border and process is in perfect health, and the process has grown up to the gutta-percha, then I fill only those that show that they are far enough apart at the cervix to permit a healthy, full process to grow that the gum will have proper substance, and cleave to the root and cover up and over the margin of the filling at the cervix. In this is your future security at the alveolar border.

No one has ever called attention to the difference in width of the proximal spaces at the cervix for the bicuspid and molars. The gutta-percha should remain in till double the width or space is gained between the molars than the bicuspid, on account of the greater size of the molars, where more proximal surface is in contact and no room left for cleansing, unless the spaces are very much greater than normal, and the contour made to suit this issue. Here is where you will say, "You will destroy the articulation and cause greater strain on the filling and the teeth." No, you are mistaken. When the whole of these proximal surfaces are filled with the semi-elastic stopping, and the act of mastication

set up, the teeth that at first are out of the normal position, and only touch on part of their crown surfaces, are now allowed to readjust themselves; as the gutta-percha will give where the greatest pressure is brought to bear, and where least resistance is offered, no change occurs. I am not mistaken in this. Try it.

This method is a test for any further treatment, which, if needed, can so easily be done. It permits of weeks, months and years before the permanent filling need be introduced. No danger of decay, none of loss of structure from fracture. And, in fact, you can dismiss the patients thus treated with the greatest indifference as to the issue. Do you ask whether I charge for all this work, and when I send in my bill? I charge for even my thoughts as well as my work. My patients never object to the gutta-percha.

Thus I practice with all; and I am happy in this, knowing that I do far more good, am not troubled about immediate root filling,—fillings falling out,—“conservative treatment of dental pulp.” Nor does pyorrhea ever invade on my domain of original work, because I know the value of articulation, and how to make every tooth perform its individual and collective function, and no improper pressure given it to press or work its life out of it and give rise to the denudation of the peridental membrane; nor is the food ever found pressing up in the cervical border and remaining, nor the cervix so weakened by want of contact with firm alveolar processes, and the gum is left to hug the root at this vital portion so tightly that nothing ever creeps in to cause recurrence.

Any dentist who allows his original patient who follows orders to have pyorrhea should be sued for damages. See that no food presses on the gum border; see that no tooth is improperly pressed and contorted by false articulation, caused by improper width and contouring; allow no biting of threads, cracking of nuts, biting of ice on one tooth only; or, when a tooth has been lost, see that the articulation is restored, and my word for it gout or no gout, syphilis or disease, pyorrhea will not come, except filth and malaise of one or more teeth.

Gutta-percha used as matrices for gold, amalgam, or oxiphosphate fillings I will not dwell on; you need nothing better. For holding teeth in position after correction where there are cavities in both, I need only mention it. As for assistance on the temporary and permanent teeth, to keep the ligature from slipping down on the cervix by carrying the ligature through it; for fastening pins in roots for crowns; as a medium between crowns and roots to prevent further caries; as a protection to all roots when a gold crown is used; and, in fact, as a factor in our practice, there is nothing to fill its place.

International.

FILLING PULPLESS TEETH WITH FISTULOUS OPENING.

Dr. C. N. Johnson, Chicago.

First the soft, decalcified, infected dentine should be cleaned from the cavity, and the pulp-chamber thoroughly opened up. The putrescent contents of the canals should be removed as perfectly as may be by way of the cavity, to accomplish which the chamber and canals should be flooded with an antiseptic, and this absorbed with cotton or bibulous paper. When the canals are cleaned the abscess should be injected with the antiseptic through the canal, and the process kept up if possible till the medicine appears at the fistulous opening on the gum.

The best means ordinarily to inject an abscess is to pack the canal tightly with cotton saturated with the medicine, and then force down on it a mass of rubber such as is used for vulcanizing plates. Where there are several canals, and it is intended to inject only one of them, the others may be left empty, and the force against the rubber directed in line with the packed canal.

When the medicine appears at the fistulous opening, if it is of recent occurrence, the cavity may at once be sealed,—after replacing the cotton in the canal with freshly saturated cotton,—and the patient dismissed for one week. If it is of long standing, where the dentine of the root seems much infected, it is best after the injection to flood the canal with alcohol and evaporate to dryness before applying the antiseptic and sealing the cavity. This insures a more thorough saturation of the tubuli with the antiseptic, and the tooth will return in sweeter condition than if the drying had been omitted.

At the end of a week all ordinary abscesses will be cured if this practice has been followed faithfully. When the patient returns, and the fistula is found perfectly closed, the root may be filled at this sitting, the same process being followed prior to filling that was advised in a root without fistulous opening.

If the fistula still discharges, a change in the procedure is called for. In the use of an antiseptic at the first sitting, one has been selected which is diffusible, and which is not strongly escharotic. Usually Dr. Black's 1, 2, 3, is employed; and it is felt that if care had been exercised in thoroughly cleaning the canal, in evaporating the moisture from it, and subsequently sealing the antiseptic in the canal for one week, the canal itself is in a condition which would not account for the persistence of the fistula. The trouble is probably beyond the apex, and the tissues at that point require more vigorous medication than that applied at the

first sitting. They need stimulation and cauterization to break up the chronic condition. With this idea, carbolic acid, ninety-five per cent, is injected till it appears at the fistulous opening. The canal is then packed with cotton saturated with carbolic acid, the cavity sealed, and the patient dismissed.

If there has been much discharge with a free opening, pyrozone, three per cent, may be injected prior to the use of carbolic acid and sealed for a week, and the treatment repeated if the fistula is found open at the end of that time. Where the discharge is slight, dismiss for two weeks after the second sitting. Frequent treatments should be avoided, unless there is a copious flow of pus indicating a rapid breaking down of tissue. Then the case must be fought vigorously, the treatment being directed by way of the fistulous opening instead of through the tooth.

In chronic slight discharge, where a third treatment has been found necessary, the dressing in the canal should not be disturbed for a month. The operator may see the patient at intervals in the meantime, and if he deems it necessary may treat the fistula through the opening; but in very many of these cases no treatment at all is preferable.

Cosmos.

We find a great difference in our patients in their capacity for bearing pain. I have taken out teeth which have been very difficult indeed to dislodge, and the patient, to my surprise, has remarked it did not hurt him much. On the other hand I have taken out perfectly loose stumps for a patient who has appeared to suffer great pain.

Cowper's line "A beetle feels a pang as great as when a giant dies"—meaning that the animal creation suffers equal pain—is untrue, and no one knows better than a dentist that there are conditions affecting the constitution and conductivity of nerves, apart from any hysteria or natural cowardice, which we must recognize and treat with the greatest respect.

Henry Blandy.

The following rather significant resolution was passed by the last Southern :

"*Resolved*, That the Southern Dental Association, with a view to unity, harmony and concerted action, appoint a Special Committee on Dental Legislation, to represent it in any movement in which its co-operation may be sought or its 'good offices' accepted, for the improvement and unification of dental laws."

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OUR QUESTION BOX.

With Replies From The Best Dental Authorities.

[Address all Questions for this Department to Dr. E. N. Francis, Uvalde, Texas.]

Question 191 (178 again.) *Lady, sixty years of age; health good. Three years ago pain began on right side of face, near antrum, and radiated to whole side of face. Pain has been periodical, lasting about one minute, with intervals of two to twenty minutes between attacks. Two years ago her physician, after treating for neuralgia, advised the removal of all teeth, which was done, and artificial ones substituted, but pain continues. It has always been confined to the spring season. Pain is so excruciating it can scarcely be borne. There has been some swelling of face, and thick pus exudes from posterior nares—no redness of gums. What is the cause, and what the treatment?*

I think it a case of deep-seated purulent catarrh. The fact that pain is periodical would suggest malarial complications. Consult a specialist in such diseases.
E. P. Mossman, D.D.S.

I think it chronic abscess of antrum, intermittent type. From question, I conclude the floor of antrum has sufficient thickness to preclude the idea of a dead pulp being responsible, hence original cause is obscure. The pain is due in part to pressure on superior dental nerve.

Treatment.—Open antrum at lowest point, through the ridge corresponding to the position of the anterior root of first molar, or through buccal surface above it. To intelligently choose between these points for opening, it would be necessary to see the patient. If the molar bone is prominent, and ridge thick and well preserved with a high vault, the buccal surface would be best for opening.

To make opening, inject at point chosen, one-sixth grain of cocain dissolved in five to seven drops of water, then with small sharp drill cut through the bone, and follow with a spear-pointed implantation instrument of about one-fifth inch diameter.

See that the opening is free and the interior bony border smooth. Cleanse by the aid of a suitable syringe with sterilized tepid water—bichlorid of mercury, one to five thousand, boiled filtered water daily, as long as there is any purulent discharge.

Keep the wound open between treatments with loose piece of absorbent cotton and listerin, full strength. The gentle stimulant action of listerin applied as above is never injurious, and is often of benefit. Nearly all cases of this class yield to this treatment immediately. If the opening does not close readily after treatment is discontinued, scarify the fleshy edge and cauterize sufficiently to completely close by irritation. Cover with good fitting plate, and instruct patient not to remove same for three days.

The case will require no further treatment. The successful treatment of an obstinate case of this kind is given in full in back number of ITEMS.

Earl D. Eddy.

Question 192. *I wish to experiment with antiseptics. Can you give me a list of internal and external antiseptics not in general use in dentistry?*

Internal antiseptics: Phenol-acetic, alantol, betol, antifebrin, para-cre-salol, guaiacol, salicylate, salacelol, naphthol beta-benzoate, sodium para-cresotate, tri-brom-phenol, bismuth, tricesol, tricesolamine, etc.

External antiseptics (application and inhalation): Terebene, sozo-iodol-zinc, sozo-iodol-potassium, solveol, sodium tetraborate, sodium silico-fluorid, sodium di-thio-silicylate, resorcinol, pyridin, pyoktanin, alpha and beta naphthol, para mono-chlor-phenol, ohto-monobrom-phenol, iodole, bituminized iodoform, hydroquinone, gallobromol, gallanol, formol, euphorin, di-iodo-thio-resorcin, di-iodo-beta-naphthol, diaphtherin, aristol, argentamine and alumnol.

External and internal antiseptics: alpha-ony-naphthoic acid, asaprol, oxy-iodid of bismuth, sub-gallate of bismuth, creolin-pearson, eucalyptol, helenin, trichlorid of iodine, paraform, resorcin, retinol, salol, sozo-sodium, sulphaminol, thalline sulphate, etc.

Question 193. *A lady, while enduring excruciating pain, ground the teeth together so forcibly as to break the enamel from point of her upper left cuspid. The tooth is sound, but very sensitive to heat and cold; at times she suffers the most intense pain for hours. What is best for relief?*

If from simple exposure of nerve fibers, touch with trichloroacetic acid, nitrate of silver, or better, attach a temporary tip of gold, platina, gutta-percha or vulcanized rubber. The gold, platina or rubber should be attached with oxichlorid.

Apply acconit externally with iodine, and administer tincture of acconit internally from one-half to one drop every half or one hour, and follow with pepper pads if you think there is liability of pulp or periodontal inflammation from shock.

Question 194. *There has been some dispute between the M.Ds. and D.D.Ss. as to the lawful right of administering chloroform, ether, chloral or morphin without the aid of an M.D., or to write a prescription for some other purpose than of dentistry. Would be pleased to get an explanation on this question.*

Chicago Dentists.

Chicago Physicians.

The question of the boundary line between the M.D. and D.D.S. has never been definitely established, and just how far each can go without encroaching on the other depends much on individual feelings and not on law, rules, etiquette or professional courtesy.

The dentist in some States pays an occupation tax as a specialist, and must be governed by those laws.

Patients are often sent to a friendly M.D. and return with the remark that "Dr. So-and-So says you know more about this business than he does,

it's not in his line." The doctor, however, often gives a prescription, and after receiving another from the dentist, the patient has gone home and produced complicated results by taking both remedies.

The administration of chloroform, gas, ether, morphin, etc., is often necessary, and all dentists should be capable of administering these without the aid of an M.D., unless it be the family physician, who may be acquainted with some family peculiarity or weakness of patient.

The average dentist gives more ether, gas or chloroform in a short time than the average physician gives in a life-time, and should understand it better.

We believe a dentist should confine himself to dentistry and a physician to medicine, and if the former is obliged to give a prescription let it be for some disease directly effecting the dental organs or oral cavity, and if that treatment is necessarily systematic, the family physician should be consulted.

Question 195. *What do you consider the best cement for fillings?*

It is difficult to answer this question. A cement may be a success under the manipulation of one operator and a failure under that of another.

Some of our best cements are quite difficult to mix properly. Temperature, moisture in the air, too little liquid, or powder, will often ruin a filling, and the chemical properties of some cements are so nicely blended that the mixing must be accurately done.

With a cement on trial, we are unable to obtain one perfect mixing out of a dozen, but when properly mixed the filling is almost permanent.

SPRAINED ANKLES.

From time to time one hears of different means of caring for sprained ankles, turned ankles, twisted wrists, etc., but the way now in vogue, says the *Eclectic Medical Journal*, seems to give better results than any in the past.

It is generally within an hour after the accident that you are called in to see the case. The patient is suffering very severely, and wanting very much to know if "anything is broken." After examining for fracture, order the part to be bathed in extremely hot water, every hour or two, for a period of fifteen minutes at a time. Have the water just as hot as the patient can bear it, and apply with a sponge or cloth, rather than allow the ankle to lie in the water. Then dry and let the part rest quietly, wrapped in flannels, when an application of hamamelis or veratrum and hamamelis may be made.

Before retiring, apply a flannel bandage tightly around the swollen part, only being careful that the circulation is not cut off.

It is surprising how the hot applications relieve the pain and produce absorption, and how the bandage, by pressure, prevents inflammation.

Scientific American.

PRACTICAL POINTS.

Mrs. J. M. Walker, Bay St. Louis, Mississippi.

Alcoholism and the Teeth.—The effect of alcohol, in excess, on the teeth, may be described as an irritant, impairing the vitality of the mucous membrane and developing a grade of chronic inflammation that is continuous. The stomach, throat and mouth become the seat of the degenerative process; the nutrition of the teeth is impaired, the pulp dies, and the gums retract. Beyond this, the effect of alcohol on the system is to paralyze—impoverish the nutritive system; conditions of practical starvation supervene, affecting all growth. Hence, degenerative teeth and gums are the natural outcome.

T. D. Crothers.

Pulp Devitalization in Temporary Teeth.—Arsenic should not be applied as a devitalizer in temporary teeth; the repeated application of carbolic acid, with proper filling, is sufficient.

A. G. Johnson.

To give a Good Color to Black Rubber Plates.—To give a jet black color instead of the dull brown shade so often seen, immerse the plate for a few moments in bisulfid of carbon; then place in water to remove the odor.

J. Levin Chaim.

Protection of Nearly Exposed Pulp.—Cut a very small piece of court-plaster and carry to the point of near exposure, gently touching it to place with the pliers. It sticks easily and affords excellent protection to the pulp; then fill the cavity, at least partially, with oxiphosphate.

D. W. Barker.

Treatment of Pulpless Teeth.—The greatest trouble comes from the ptomaines—the product of bacteria. Ream the canal out and cleanse as thoroughly as possible; then fill with gutta-percha dipped in chloroform and iodoform. I know of nothing that will destroy the ptomaines as effectively as iodoform.

Dr. Maxfield.

Manipulation of the Zinc Cements in Hot Weather.—Fill a wide-mouthed jar with broken ice, and pour in ice-water to fill the interstices, and force the ice against the surface of the glass. The setting of cement can be perfectly controlled by the use of this cold-mixing base. In crown-setting, place the crown on the same base while mixing the cement, keeping both at the same temperature. Use platinum-pointed instruments, to which neither cement nor gutta-percha will stick.

H. G. Register.

Hypertrophy of Pulp and Gum Tissue.—These growths, which frequently fill large cavities in the molars, may be removed

by repeated applications of 90 per cent trichloroacetic acid, wiping out the growth, a layer at a time, without hemorrhage or pain.*

E. C. Kirk.

Pulpitis with Exposure.—Instantaneous relief follows the application of thymol, either the powdered crystals, or a saturated solution in chloroform applied on cotton, under a suitable temporary stopping.

E. C. Kirk.

Root Canal Filling.—After removal of pulp dry thoroughly, apply eucalyptus oil, place in chloro-percha and insert gutta-percha points; or, if canal is too small, a fine copper point. The oil of eucalyptus causes the gutta-percha to adhere to the dry walls of the canals and the point squeezes out the excess.

C. R. Taylor.

Iodoform in Pulp Capping.—Bleed the exposed pulp freely. When hemorrhage has ceased apply a thin coating of iodoform and alcohol, made in a creamy mass—"alcodiform." Evaporate the alcohol and cover with a thin layer of chloro-percha. Evaporate the chloroform and flow over thin cement. When this has hardened fill with cement. Cut away excess of cement for permanent filling.

S. M. Johnson.

Alveolar Abscess.—Aromatic sulfuric acid (a 20 per cent solution of H_2SO_4 reinforced with the stimulating properties of ginger, cinnamon and alcohol) is very efficacious in the treatment of alveolar abscesses—the acid dissolving the carious matter, the stimulants aiding nature to overcome the pathological condition. Protect the enamel walls by a lining of chloro-percha, open through gum and alveolar process to secure good drainage; use syringe points and broaches of non-corrosive materials; neutralize the acid action in the tooth before dismissing patient; apply ammonia to any stains on clothing or napkins.

J. W. Davy.

Finishing Rubber Plates.—I use about one-third emory with my pumice for finishing plates, and finish with half the labor and time. I cover the palatal surface with oil or glycerin to remove the last traces of plaster.

G. C. Cowles.

To Clean Rusty Instruments.—Fill a suitable vessel with a saturated solution of chlorid of tin in distilled water. Immerse the rusted instruments and let them remain over night. Rub dry with chamois after rinsing in running water. They will be of a neat silvery whiteness.

M. L. Brodie.

*To the cauterized end remaining in the canals apply arsenic and iodoform, four times as much of the latter, and one drop carbolic acid combined with cotton the size of a pin's head, covered with a tin cap and sealed in with oxiphosphate. Remove in four or five days.

A. C. Hart.

To Anneal Swiss Broaches.—Warm a strip of base-plate gutta-percha till it is soft; wrap it thoroughly round half-a-dozen broaches and set fire to it. When it has burned out let the charcoal remain around the broaches till cool, and you will have a finely annealed broach.

W. M. Carter.

Preparation of Gutta-percha.—Cut sheet gutta-percha in strips, and place for two or three days in a solution of oil of cajeput and chloroform equal parts. Then warm it till thoroughly soft, and add plaster of Paris till of the consistency of putty. Knead thoroughly in the hands, roll into strips, and it is ready for use as filling material when the chloroform and cajeput have evaporated. It softens at low heat, packs readily in the cavity, does not drag, and becomes quite hard after it has been in the mouth for sometime.

A. H. Stoddard.

Alcohol in the Treatment of Cavities.—In its antiseptic and cleansing properties alcohol is the peer of anything in the dental materia medica. It can be used with more freedom and facility and efficiency than anything I have tried.

D. D. Atkinson.

Mouth-wash for very Tender Gums.—

- R.—Chloroform..... fl. dr. ij.
 Tinct. arnica..... fl. dr. ij.
 Listerin..... fl. oz. iij.
 S.—Dilute one-half with warm water, and use as mouth-wash.

J. Henry Morgan.

Protection of Exposed Nerve.—Cover with gum mastich dissolved in chloroform, and sprinkle with the powder of oxichlorid cement. Then fill with oxiphosphate cement.

J. M. Mason.

Pulp Devitalizing Paste.—Arsenious acid ground up with creasote, with sufficient glycerin to make a paste; add a few drops of otto-of-roses to overcome the odor of creasote. Will keep indefinitely.

Wm. H. Trueman.

Protection of Oxiphosphate Fillings.—To exclude moisture, thus securing a dense filling, apply a coating of chloro-percha over the finished surface of the filling. If the dam is left on till this varnish has hardened by evaporation of the chloroform it will not wear off for a week, and I have known it to last for two months.

R. Ottolengui.

Swaging Aluminum Plates.—Place a piece of paraffin paper between the die and the aluminum; over the aluminum place thin rubber-dam and mallet in proximate form. Remove the rubber-dam and place paraffin paper between the aluminum and the counter die. Prevents both leading and battering. * * *

For Packing 'Pyorrhea Pockets.—In the suppurative catarrhal conditions:

R.—Soziodol and zinc gr. viii.
 Morphia..... gr. ij.
 Lanolin $\frac{3}{4}$ i.

M.—Sig. Anastopical application.

And as a mouth-wash, $\frac{1}{2}$ gr. soziodol to the ounce of water, allays inflammation, stops suppuration, and hastens granulation.

W. X. Sudduth.

Disinfection of Putrescent Root Canals.—With a Donaldson bristle introduce in the canal a little powdered permanganate of potash, and drop on it with a syringe peroxid of hydrogen. Pump it up and out quickly. Nascent oxygen is set free in the canal with violent effervescence. The teeth so treated show a remarkably quick cure.

D. W. Barker.

To Keep Flasks Clean During Vulcanizing.—Put an ordinary upholster's spring in the vulcanizer to set the flask on. It keeps the flask clean, enables it to be easily removed and prevents the contents from getting burnt.

Dental Headlight.

A Durable Crown.—A crown second to none in durability is made by using a pivot-tooth with silver pin and backing, soldered with silver solder, and set with cement mixed thin, and soft amalgam, equal parts, finishing the portion exposed to the fluids of the mouth with amalgam only.

* * *

A Simple Splint for Fracture of the Lower Jaw.—Without attempting to hold the fragments of the lower jaw in place, take impression of the teeth in both jaws and make casts. If necessary, saw the lower cast in two at the line of fracture and reconstruct to have correct articulation with the teeth of the upper jaw. Reproduce the corrected cast of the lower jaw in Melotte's metal, and swage a plate to cover several teeth, anterior and posterior to the fracture, and of sufficient length to cover at least two-thirds of the length of the teeth. Cement the plate (or splint) in place with phosphate of zinc. This is cleanly, easily made and permits of opening and closing the mouth at will.

Thos. L. Gilmer.

Sterilizing and Drying Cavities.—I want to cut till I have got strong, healthy tissue, and when I have done cutting I put the filling material against the healthy tissue just as I cut it. I believe it is the best way to do. We cannot sterilize the cavity with anything whatever, and have the walls afterward in as good condition to receive the filling as before. . . . There is no danger in drying then with cotton. . . . I am compelled to feel there is danger in drying teeth by heat.

G. V. Black.

ITEMS.

QUERY.—Is it any more “cheeky” for a graduate of a reputable dental college to subscribe himself “D.D.S.,” than for a like graduate of medicine to use “M.D.?”

J. P. Anderson, Sherman, Texas.

* * *
Does your pyrozone get away? Is there odor of ether about the bottle? Powder an old corundum point and moisten with water. Revolve the glass stopper, charged with this powder, forcibly in its socket. In three minutes you will have a perfect fit.

J. P. Anderson, Sherman, Texas.

* * *
To remove modeling composition that adheres to the cast caused by overheating in separating, run hot wax over composition with the spatula, allowing it to become thoroughly hard. Pass the point of the knife blade under the edge of the wax, peeling it off; the composition will come with it, leaving the cast perfectly clean.

F. Messerschmitt, D.D.S.

* * *
What are we going to do with our patients who are unfortunately troubled with “white decay” in their teeth? Especially where it pits and follows the margin of the gums and attacks the teeth around carefully made gold fillings after several weeks? Is there a constitutional and local treatment to remove the cause of this malady of the teeth?

W. H. Upjohn.

* * *
Dr. Johnson, in his article in March number, gives this suggestion: “1st. Vulcanize the rubber plates between metallic surfaces.” I am free to admit that I do not know how to do that, and I believe there are others. I should like to know how, as it is a good idea. Won’t you, or the doctor, explain in detail how to get the polished surface between metal.

Dr. P. L. Haight, Little Falls, New York.

* * *
I have been in the habit for some time of substituting keoplastic dummies for gold or porcelain in bridge-work where they would not show, and more especially where there was very little space. I first fit the crowns, solder one or two bars of gold or platinum from one crown to the other, fit them in place, remove them with an impression, place them on an articulator, mold and contour wax teeth to suit, flask and run metal. This gives a solid, durable bridge, cheap and easily adapted.

M. B. Cullum.

Dr. Jessie M. Weston, one of the graduates of the Woman's Medical College, of Philadelphia, in 1893, has been elected to the medical staff of the Connecticut State Hospital for the Insane, at Middletown, occupying the only medical position which the Nutmeg State government has thrown open to women.

Dental Register.

* * *

In making full sets of teeth I nearly always leave off the first bicuspid so as to throw the molars further forward. Better use large jaw teeth and fewer of them. If the first bicuspid is needed to fill the arch, put it behind the second molar. Especially in lower sets I want large molars, so that in chewing there can be more latitude for grinding instead of mashing of food. And why in the dickens can't our teeth manufacturers be impressed that cuspids should be made more prominent so as to look more natural.

J. W. Greene.

* * *

TO SAVE LOOSE GOLD FROM A FILLING.—In drilling out, take a piece of wire about as heavy as an ordinary lead pencil and five inches in length, and bend slightly. Fasten it on to the rubber-dam after the dam is in place on the teeth, by taking hold of one corner of the dam about half an inch from the lower edge. Stretch the dam over one end of wire as though you intend to punch the wire through it; draw rubber-dam tight over the other end of wire so as to make a pocket, and you have it. I call it my Gold Catcher.

E. T. McKim.

* * *

A gentleman of thirty-five came to me with a lower central badly affected, the gum receding so that the tooth was ready to drop out, pus coming from the gum and a great deal of inflammation. I fitted a narrow band around the three front teeth, and soldered them with a narrow band in the back. These were inserted on the teeth which held the affected one firmly in place, and cemented on. I injected peroxid of hydrogen in the pus pocket. In two weeks all inflammation was reduced. I applied tincture of iodin and aconit. I succeeded beyond expectation.

Luella Cool, Guatemala City, Central America.

* * *

PRESERVING THE COLOR OF FLOWERS.—The following method of preserving the colors of dried flowers, applicable to even the most delicate poppies, has been discovered by Herr Nienhaus. Ammonia in the air is the main cause of flowers losing their tints; so Herr Nienhaus presses his specimens between paper which has been previously saturated with a solution of one per cent of oxalic acid in water.

EDITORIAL.

OXIPHOSPHATE COVERED WITH GOLD OR AMALGAM.

Sometime since we called attention to the advantage of nearly filling cavities with oxiphosphate, and then, while this is still soft, working in it alloy or gold. Perhaps it would be well to go a little more fully into the details of this compound process.

After the cavity has been prepared and the tooth isolated by the dam, the cavity is filled with quite sticky cement. Quickly this must be cleaned from the edges of the cavity, so that when the metal is added none of the cement will be exposed. A great advantage of the cement is that it sticks permanently to the walls of the cavity, making the filling absolutely impervious. We are not sure but there are several oxiphosphates that, when properly mixed, has this extremely sticky property. We know what we have made for the last six months has.

If the oxiphosphate is to be covered with alloy, rub in a thin coating of a soft mix, and when the oxiphosphate has sufficiently hardened, add enough alloy to finish the filling. While the cement is hardening, work may be done on some other tooth.

If the oxiphosphate is to be covered with gold, poke small pieces of crystal, or other adhesive gold into the sticky cement, and when the cement is sufficiently hard, work these pieces down, at the same time gradually adding sufficient adhesive gold to properly finish the filling by hand pressure.

It is not necessary to have the coating of alloy or gold very thick. If the oxiphosphate is entirely covered, it will not disintegrate.

The advantages are these :

1st. It makes the most perfect filling, because of the adhesion of the cement to the walls of the cavity. Then, too, some amalgams shrink—oxiphosphate does not; and in all large cavities, when even unshrinkable alloy is used, sufficient moisture may enter to produce discoloration and possibly decay. Many gold fillings that

are supposed to be water-tight are not, but oxiphosphate always is. In filling with gold, the gold often "balls," "rocks," or the shape of the cavity is such that you are deceived in the character of your work, but you have none of these difficulties with oxiphosphate. It is a perfect filling, if covered.

2d. It is a surer filling for frail walls, because less force is required to put it in place; and because of its adherence to the walls of the cavity, actually strengthening the frail walls; and because in many amalgams there is sufficient swelling during hardening to burst such cavity walls. In filling with gold, the force with which it has to be pressed against the walls often crack them. When this injury is not at first apparent, it is afterward sometimes discovered to the ruin of the tooth.

3d. When the dentine is soft or sensitive, it is not necessary, with this filling, to remove so much as when metal is used, because the cement hardens the softened dentine and overcomes its sensitiveness, and thus prevents further trouble. But this should not be an excuse for leaving actual decay. If the dentine is extremely sensitive, equal parts of creasote and oil of cloves mixed into a paste with tannin should be rubbed on the sensitive part.

4th. This compound filling is the very best in freshly exposed pulps. First put in a drop of chloroform to overcome pain, then a very little of the above paste, and then cover with a disk of paper smeared with a little thick Canada balsam. If there is much pain and soreness, fill temporarily for a few days with sandarac varnish on cotton or pink rubber base plate. But generally you may make your filling permanent with oxiphosphate over the balsam.

The test, the discipline of men, is the making of them. Some men are so headstrong that, unless they were prevented by the inevitable, they would have the will to destroy the very fabric of Providence. We all like high-strung horses, but woe be to the driver who does not curb and intelligently manage them. Strong-minded men and women move the world, but they should be thankful that there is one higher than they who holds the reins. How often we have found that our own pet way would have been our worst way—that in our determination to have it, the barest "accident" saved

us from destruction. An injury, a down right failure, in some direction, brings us to wise reflections that are worth more to us than success. "The worse thing that could happen" proves sometimes our best lesson.

We need rain as well as sunshine; "the winter of our discontent" as well as the genial summer; and we need sorrow as well as joy; preparation as well as growth. In the life of the successful there is seed time and harvest, work and triumph. We go forth burdened, fearful and heavy hearted; but we return "rejoicing, bringing in the sheaves." The kaleidoscope is ever changing, yet at every turn there may be wholesome lessons, whether the colors be gay or sombre. Happy and wise is that man who can find something valuable in them all.

KEEP UP.

I know two dentists who do not seem to have improved for twenty years. In quantity and quality of work, in appearance and surroundings, in influence and popularity, in manners and habits they remain just about where they were a whole decade ago; only a little more so.

Improvement in most of us is so gradual that we cannot see it from day to day; but in looking back from year to year improvement should be quite apparent, and there is, or there is sure to be a decline. The dress will be a little more seedy and the manners a little more indifferent, bad habits will be a little more conspicuous, and patronage and finances a little more discouraging.

Oh, do not die that way! Wake up, open the windows, and shake yourself; brush off the mildew; sweep down the cobwebs, and burn up your old clothes; come out where the passing breeze of improvement can inspire you, where the lightning of enthusiasm can make something of you.

Spring is here. Come out of your cold, damp, dreary cave into the sunshine. Your hybrid retreat has left you gaunt and emaciated. Pretty specimen, you, to come into good society. No wonder you are avoided as a bony skeleton to frighten children with.

WHERE AND WHAT IS LIFE?

Life is everywhere and in everything. Even the solid rock has it; and the crumbling rock, as it is disintegrated by the frost and sun and rain; and is sent down the steep mountain to fill up the valley, only increases its life and its power to produce vegetable life; and this in turn animal life; and this to be transformed in our life.

The huge rock looks solid, but view it through your magnifying glass. Now it is a million of worlds. Between its grains is sky and earth and soil and life.

As the life of the vegetable sucks up this life and refines this soil, and transforms its nature into a new and higher growth, it comes up laughing and brightening and developing, till in all manner of forms it covers the earth with beauty and richness and usefulness.

The wonders of the vegetable can be seen without the magnifying glass. Its blood circulation in form of sap, is charged with all the elements of its life; its net-work of cells and valves and wonderful membranes and organs, are apparent everywhere. But with the microscope, oh how much more wonderful God's hand is seen, working from rootlet to leaf. These leaves are its lungs, through which it breathes, and its roots are its thousand mouths, with ten thousand teeth, through which it takes and grinds and swallows its food, to be digested and assimilated and sent into its great circulation. Its bark is its skin, its sap wood its muscle, and its heart wood its bony strength.

But a still higher life is the animal. Here we find a complex life. Sensation and locomotion is added to circulation and assimilation. The tree has a warmth above its surroundings; but the animal maintains a heat that is marvelous. Chemical? Yes; but far more vital. And what do we mean by vital? Ah, philosophy and philosophers say not. Even science and scientists are silent, or speak to show their ignorance.

But above this life there is life more abundant. The life of the mere animal is complex, but the life of man is threefold. The rock shows life by its growth, duration, maturity, and inherent

bond of unity. But its chemical and electrical forces are more the mere resemblance of life. The phenomena is interesting, but the distinct life of the vegetable is a system; and the double life of the animal is still grander, while the triple, the triune life of man, is the climax of all the world of creation. It is unique; it is incomparable; it is majestically above and beyond all else in character, duration and destiny.

We speak of the heart as the center of physical life; but life is everywhere, coming, growing, maturing, from the time food in chyle enters the mesenteric glands till it is sent perfected from the lungs to the heart. We speak of the brain as the center of life, but what is the brain but a bundle of nerves? And what are the nerves but the unraveled cords of brain? The enastomosis of arteries with veins is a wonderful center of life. The great center of sensational passion we call the sympathetic or ganglionic system, just below and in front of the heart, is a controlling center of life to lungs and stomach and brain.

Show your genius in some way. Even if you bring nothing new to perfection, yet by thorough thinking, severe discipline, and close application the mind and muscles will be developed, the skill sharpened, and your views so broadened as to prepare you for final success. Real inventions are not brought about by every effort, nor by every life, but by close study and labor; when you least expect it, a bright idea may dawn on you that will follow you till something comes of it that may be better than a new creation. Do not be discouraged by failures; they are often the stepping stones to success, and though this success may not be where and what and when you intended, it may give you a large place of richness and pleasure. If, therefore, after all, you bring about nothing new worthy your effort, yet the accumulation of knowledge, the added skill of manipulation, and the maturing of your whole character, will well repay you for your "lost" time in seeking something new. This of itself will be a wonderful success—something better than invention—it will be bettering what is already invented, and for this the world will accord you an honorable place.

Long-lived trees grow slowly, and there are few quickly maturing trees that make solid wood. In my maturity I would much rather be a stalwart oak than a coarse-grained, sappy, drooping willow. Oh, yes! the willow is good for something. Its easily twisted canes are good to braid and sit on, as are many weak-minded men. I am told its head makes good gunpowder, as do many inflammable heads.

Though it needs much patience to wait, and much labor and courage to dig down in the hard earth for strength and nourishment, yet once an oak we have something substantial, useful and enduring. As year by year sap wood is pressed closely and hardened into heart wood, and as the internal forces heighten and enlarge and strengthen and straighten its noble trunk, and beautifully ingrain it, and its great stately head spreads out over other trees so majestically—ah, it is grand! Let me be an oak.

THE GUM NUISANCE.

I admit chewing tobacco is worse; but my, how can we classify this eternal gum chewing? If it is not among the vulgarities, where can we place it? It is bad enough to see the jaws going in the laboratory. But what a habit! If it is used as a cud there, it is almost sure to be retained when company calls. "O well, it is no use throwing it away; we know there is a place for it in the mouth, outside the teeth." Ah, it is not safe anywhere. Unconsciously the jaws will begin to go off right in the patient's face. It is too bad. Why, I know a man who keeps it in his mouth while singing. He does not use it—that is not consciously. How disgusting to see him chewing the moment there is a pause between notes sufficient to give one's jaws swing!

Perhaps the worse feature of this jaw swinging business is that ladies are taking it up,—first in private and at home, and then in public—actually in the street, in the shop, in tolerably good society, on the railroad, and in the lecture-room, and sometimes in the church. What next? It is such a mania, we hardly know what to expect. It is sloppy. It is degrading. It is an offense.

HINTS.

Who has had experience in aluminum crowns? Dr. F. H. Ellsworth, of Millsville, N. Y., says he is quite successful with it.

Another gentleman writes us he has had good success in lining rubber plates with aluminum of about 26 gage.

* * *

A specialist in gold and bridge-work writes us that Welch's oxiphosphate is the best he has used. When properly mixed it is slow setting and sticky to the gold and tooth, does not crumble and is eminently hard and durable.

* * *

ANTIDOTE FOR CYANID POISONING.—Cobalt nitrate is found by Dr. Johann Antal, a chemist of Hungary, to be an antidote to prussic acid and cyanid poisoning. First he tried the cobalt on animals, and then, presumably at different times, on forty living persons who had been accidentally poisoned by prussic acid, and in all cases the results are reported to have been satisfactory.

* * *

Strength, sweetness and popularity are not antagonistic; they don't fall out by the way. They company along joyously and helpfully together. How quickly and graciously a Christian lady or gentleman show themselves. As quickly do boors make themselves known. In this analysis neither dress nor rings count. Station or occupation—nothing. This grace is an acquired, not an inherited one. Acquire it then and use it.

* * *

Hard mixed alloy is stronger and has less shrinkage than soft mixed, though greater care is required to adapt it to the cavity. Hot instruments will enable us the better to use hard mixed alloy, and to give a better finish to its surface. Hard pressure condenses it, thus insuring it against shrinkage. If by this pressure free mercury comes on the surface, it should be removed with bibulous paper, tin or very thin gold foil. The surface is made all the better if this gold is allowed to remain.

An alloy thus inserted will set much quicker, become much harder and remain much smoother, cleaner and brighter.

A transparent mirror glass, says *Invention*, introduced by Herr Alfred Rost, of Halbstadt, reflects light on one side, from which it is practically opaque, while from the other side it is transparent. It is proposed to use this type of glass for glazing windows in the streets of a town; for, while it will not cut off light or vision from the interior, it will prevent outsiders from seeing in a room.

* * *

As dentists we should be dignified, not too familiar; polite, not too talkative; kind, not pusillanimous. Our patients will respect us for respecting ourselves, for a carriage of courteous quietness and genuine sympathy, which is quite different from taciturnity, grumness and an assumption of superiority or superciliousness and maudling effeminacy.

Our patients have a claim on our best behavior as well as our best work, and yet they may not take us in their social fellowship.

* * *

I am sick of this frequent clamor about amalgam "bulging up on its surface," "its spheroidal tendency," and that "it frequently wears away" and "sometimes shrinks from the walls of the cavity," etc. Why not admit at once that you are an ignominy in its use? I used to say it never wears away and never bulges, never shrinks from the walls and never crumbles. But I have since seen so many slovenly and ignorant operators I can believe almost anything. They will buy any kind of amalgam that is the cheapest, "for I find little difference in any of them," and they will pour in the mercury till it is flooded, caring only that their lump shall last soft while they are filling eight or ten cavities and thinking only of how soon they can earn a dozen dollars.

* * *

TO PREPARE GUTTA-PERCHA FILLING MATERIAL.—A method is given by Dr. A. H. Stoddard, Boston, in the *International Dental Journal*, to prepare a gutta-percha filling material that softens at low heat, packs readily in the cavity, does not drag, yet becomes hard after it has been in the mouth for some time.

It is prepared from sheet gutta-percha, is cut in strips, and allowed to stand two or three days in a solution of oil of cajeput and chloroform, equal parts. Then it is warmed till it becomes thoroughly soft, and plaster of Paris is added till it becomes about the consistency of putty. It may then be taken in the hands and kneaded thoroughly, rolled in strips, and allowed to remain in the open air till the chloroform and cajeput evaporate, when it is ready for use.

FOR OUR PATIENTS.

AMALGAM.

Prof. J. Foster Flagg.

Look at the tons of it used; yet so many men say they do not have it in their office.

Do you ask for proof of failure?

Take the craze for "copper amalgam." What a curse it has been to the profession and their patients! I never used it once! I saw what it was when I looked in patients' mouths when I was abroad. Had they known what proper contouring was they would never have used it so universally in all cavities.

It has been a stench in the nostrils of nearly every American dentist.

Has amalgam any good qualities in itself? Have we any good alloys?

How many men know how to use it and get the best results? What curses have been heaped on its hallowed head? Where is the man who dares say he uses it? Anathemas come thick and fast from the M. Ds. of both old and new school as if they were the Supreme Court to sit on its merits.

Several years ago, at one of the first meetings of our Odontological Society of Pennsylvania, one of its oldest and most prominent members went so far as to place on record in the Proceedings: "All men, falling away from manipulative ability, lean on plastics." To-day he is experimenting to find an ideal alloy to help him out in his failures with gold. How sad such a record! Who among you so mean as to deny using it and without "apologizing?"

I say it is one of the grandest filling materials we have,—and while I have spent nearly thirty years in inventing power mallets and special smooth oval points for gold work, I confess I throw all aside very quickly, and while I delight to wield the electric or mechanical mallet in distancing time and space with gold, yet I use more amalgam to-day than ever before in my life.

I am thankful I had the courage and principle to stand by it, and recommended and show how much could be done when condensed under Japanese bibulous paper. To me it is a sheet-anchor for the class of cases every day coming to me from others. If you use amalgam and wish to make your practice a success with it, learn how to manipulate it and prepare your cases for its adaptation.

International.

NITROUS OXID DELUSIONS.

They are both ladies prominent in the most refined, religious and social circles to be found in Kentucky, and reside not a hundred miles from Stanford. One, whom we will call Mrs. A., was a modest matron, and desirous of having several teeth extracted, called on her neighbor, Mrs. B., to accompany her to the office of the dentist and help her get her courage up. Reaching the office presently, it was found that Mrs. A.'s was at a very low ebb, and she was persuaded to try the efficacy of "laughing gas."

The dentist "had given it to scores of patients; there was not the slightest danger," and he assured Mrs. A. that she would recover from the effects of the gas in a little while, and would suffer no pain whatever. With nerves wrought up to the highest tension Mrs. A. took the chair, and the dentist began to administer the gas, the effect of which was somewhat startling to him and absolutely horrifying to Mrs. B.

The patient was getting well "under the influence," when the following dialogue occurred:

Mrs. A. Is everything ready?

Mrs. B. Yes, everything is all right.

Mrs. A. Has the doctor come?

Mrs. B. Yes, the doctor is here.

[Here the doctor gets his nippers on a decayed molar, and after a few twists and jerks, lifts it out.]

Mrs. A. Oh, my! nobody ever suffered such pains; doctor, will it kill me?

Doctor. Oh, no, madam. It will soon be over (as he drops another tooth on the floor).

Mrs. A. Where is papa?

At this point Mrs. B.'s veil was drawn fourteen double over her face, and the dentist's face turned as red as a beet as he drops out the last ugly tooth and hastily sprinkles a little water in the lady's face.

In a greatly relieved voice, Mrs. A., still laboring under the delusion, asks, "Is it a boy or a girl?"

Courier-Journal.

There is hope for any one when a cross, surly, quick-tempered dentist can succeed. I know one such, but he would fail if it was not for his amiable wife, and she has a hard time holding him up. It is a shame for such men to be in the profession. They ought to be ploughing or blacksmithing. Even then I should pity the horses.

BUSINESS APHORISMS.

Carlyle wasn't a man of business, but he would have made a success of it, had he tried it. In his writings one finds these lines of solid business truth :

"A laugh is worth a hundred groans in any market."

"Have a smile for all, a pleasant word for everybody."

"To succeed, work hard, earnestly and incessantly."

"All honest men will bear watching. It is the rascals who cannot stand it."

"Better have the window empty than filled with unseasonable and unattractive goods."

"When you hang a sign outside your place of business, let it be original in design and of good quality."

"Wondrous is the strength of cheerfulness; altogether past calculation its power of endurance. Efforts to be permanently useful must be uniformly joyous, a spirit of sunshine, graceful from very gladness, beautiful because bright."

Scientific American.

Dentists are noted for being spendthrifts. Only a comparatively few are economical and systematic in money matters. Most of them keep a poor account of what they make, spend, or owe, and hardly of the work they do, or of the money due them. If any other class of men lived like this they would be financially ruined. Because it comes easily they spend it freely, having little forethought for future exigencies. Said I to a leading dentist in New York, a time since :

"How many dentists are there in the city who lay-by five thousand dollars a year?"

"If you ask me how many *could* lay-by five thousand dollars a year I could give you many, including myself; but I know but few who do. Perhaps ten of our four hundred."

"How many lay aside a clean thousand?"

"Not forty."

"How many own their homes and are considered well to do?"

"Not fifty; I doubt if there are forty. Yet," he continued, "two hundred earn enough to lay by something every year, and many ought to be rich. Few are forehanded because nearly all are spendthrifts."

What maintains one vice would bring up two children. Ben Franklin, the shrewd philosopher, were he alive to-day, would regard prohibition from the economical point of view.

GOOD MAXIMS.—A well-known banker says he owes his success to observing the good advice of an older friend, who told him to keep good company or none. Never be idle. Cultivate your mind. Make few promises. Live up to your engagements. Keep your own secrets. When you speak to a person, look him in the face. If any one speaks ill of you, let your life be so that no one will believe him. Live within your income. Small and steady gains bring the kind of riches that do not take wings and fly away. Earn money before you spend it. Never run in debt unless you see a sure way to get out of it. Never borrow if you can possibly avoid it. Do not marry till you are able to support a wife. Never speak evil of any one. Be just before you are generous. Save when you are young and enjoy your savings when you are old.

DECAYED TEETH.—Just what effect on the stomach is produced by the constant swallowing of bacteria and pus from diseased teeth, mingled with decomposing particles of food, we are unable to determine, but it is reasonable to suppose that gastric disturbances are greatly aggravated if not induced by so doing. In every community there are those who are enthusiasts on the subject of pure air and wholesome food, but whose mouths are in such a neglected condition that the air which passes through them is almost as polluted as that of a crowded tenement, and every mouthful of food swallowed carries with it in the stomach millions of bacteria. The almost entire futility of sterilizing articles of diet for patients in whose mouth chronic abscesses exist, or whose teeth are covered with tartar mixed with mucus and food in a state of decomposition, need hardly be mentioned.

THE RULING PASSION.—Doctor.—A careful diagnosis of your case leaves no doubt that you have stone in the bladder.

Solomon Isaacstein.—Doktor, do you tinks it will be a diamont?

EMPTY SPACE.—Physician.—Considering the weak state of your eyes, it will be as well if you gaze as much as possible in empty space.

Patient.—All right, then; I'll keep looking in my purse.

In mucous patches in the mouth relief may be afforded by the frequent use of a gargle and mouth wash, as follows:

R.	Listerin.....	2 drachms.
	Glycerin.....	2 ounces.
	Pinus Canadensis.....	1 ounce.
	Rose water.....	q. s. ad. 8 ounces.
	Mix.	

NOTICES.

The thirteenth annual meeting of the North Dakota Dental Society will be held in Fargo, May 15th, 16th and 17th, 1895.

C. L. Ross, Secretary, Fargo, N. D.

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The Alumni meeting of the Baltimore College of Dental Surgery was held in the College Building, Thursday, March 21st, 1895. The following officers were elected for '95 and '96: Chas. A. Meeker, D.D.S., Newark, N. J., President; Edw. Nelson, D.D.S., Frederick, Md., Vice-President; W. W. Dunbracco, D.D.S., Baltimore, Md., Secretary; T. Sollers Waters, D.D.S., Baltimore, Md., Treasurer.

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NATIONAL ASSOCIATION OF DENTAL EXAMINERS.—It is earnestly requested of the presiding officers or secretaries of the Examining Boards throughout the States and Territories, that they kindly forward to the National Secretary the full list of officers with their respective addresses.

In view of the large meeting expected at Asbury Park this coming August, the Secretary desires to give every Board notice in ample time, and likewise obtain a corrected list of officers to date. *Charles A. Meeker, D.D.S., Secretary, Newark, N. J.*

* * *

A sudden death under peculiar circumstances occurred at Kane, Pa., recently. J. F. Frampton, an oil worker, was having a tooth extracted at the office of Dr. Parker, and chloroform or some similar anesthetic was administered to make the unpleasant operation more easy. When the work was done and efforts made to revive the patient, it was found that resuscitation was impossible. He died soon afterward. The deceased was thirty years of age and unmarried.

* * *

The Dental Department of the Western University is becoming quite a success. At their last commencement they graduated seventeen. From all reports received they are evidently taking high ground and doing good substantial work.